

# COMMODORE

M A G A Z I N E

VOL 4 ISSUE 1

JUNE 1984



**SPECIAL GRAPHICS ISSUE**  
+  
**LISTINGS**





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# COMMODORE

M A G A Z I N E

AUSTRALIAN COMMODORE USERS MAGAZINE

VOLUME 4 NUMBER 1 JUNE 84

The objective of this magazine is to disseminate information to all users of Commodore computer products. This magazine contains a variety of information collected from Australian and New Zealand authors and other Commodore publications.

Contributions from all Commodore User Groups and individual users are encouraged. All copy and advertising should be addressed to the editor.

**Commodore Magazine** is published 6 times a year. Produced by Mervyn Beamish Graphics Pty Ltd., 82 Alexander Street, Crows Nest 2065, NSW. The cost of annual subscription is \$A30 postage paid within Australia and \$A38 overseas postage paid. Subscriptions available from your local Commodore Dealer or the Publisher.

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# EDITORIAL

M E R V Y N      B E A M I S H

Well, here we are again! Another year, another volume. The team has been putting a lot of thought and effort into getting a new look magazine to you.

Since the last issue a lot of things have happened with the Commodore Magazine. This issue has been ready to go to print since March but there were some difficulties in appointing a new publisher. Now that our delays are over it's back to getting your magazine up and running.

We have a few new aims for this volume:-

First – we will now get the thing out vaguely on time. No excuses but you will need to bear with us on this one as we attempt to cut back lateness little by little each issue.

Second – as the majority of our readers are owners of Commodore equipment our concentration will be on applications and peripherals as opposed to machine reviews.

Third – the most asked about feature of the magazine is 'do you have any listings?' Well, we are going to attempt to print at least ten pages of listings in each issue, (and I hope you the reader, will help us). And yes we will try to include some CBM 4016 – 4032 listings.

Fourth – in each issue we will highlight some aspect of Commodore computing. This issue is graphics.

Fifth – with a minimum amount of 'RAZZA-MATAZ' we will be holding small software competitions with books and software as prizes.

Well, having said all that, I have to attempt to carry out my promises (It is an election year after all.

Enjoy your Commodore Magazine. The team and I get quite a kick out of doing it, although during the production of each issue we swear that we will give it up. Let us know how you feel we are going. I can always suck my thumb and stand in the corner.

Mervyn Beamish  
EDITOR





# STRATEGY IN 'REACH FOR THE STARS'

By Ian K. Trout

Co-Author of 'Reach for the Stars'

On being invited by Mervyn Beamish to write a short article on strategy in RFTS (Reach For The Stars), I promptly said yes. Now it seems I have the same problem he faced when first getting into RFTS – only this time in reverse. All the articles I have written to date have been specifically for strategy gaming magazines (either computer or conventional board games) where I could reasonably expect most of the readers to be well in tune with what I was writing. I hope those of you who read further find this article interesting if not enlightening.

## **Firstly - How to get your economy going?**

More than anything else it is vital to manage your resources profitably. You will need three fully developed planets (by this I mean an IND of 50 or more and a SOC of 90-100) before you can afford to go to war and have a reasonable chance of success. It is almost always unwise to attack an enemy planet's defences unless you have enough colonists/stormtroopers to hold the planet until more occupation troops can be brought in.

Planetary conquest is generally the quickest (as well as the most risky) way of expanding your empire and serves the dual purpose of weakening your opponents. To specifics. When developing a planet it is advisable to keep a small warship force over the fledgling colony. Build up the IND and PDB's as quickly as possible. To do this, spend nothing on your established systems other than PDB maintenance and consumer goods). Increase the SOC and PE to 90-100. Once this is done, select another planet (min IND 40-50, min PE 65) and use the resources from the two planets to get this one going fast. Tertiary and Hostile planets are best left alone in a short game – they simply take too long to reach maximum productivity.

Somewhere between 25 and 35 PDB's represent the most useful number for planetary defence. Remember that while the PDB's are relatively inexpensive to acquire,

their continual maintenance costs eat into your budget, eroding the potential striking power of your mobile Starship fleet.

In the 40 turn scenario it is not really practical to consider anything higher than Level 2 Starship technology. You should plan to acquire this technology somewhere between turn 16-20. Nobody is likely to have a lethal number of MK II's available for conquest until after this time.

Around turn 20-24, scan the galaxy carefully to determine a likely target for your soon to be mobilized Starship Fleet. Send a small expeditary force to make sure that the target for conquest is both inhabited and ripe. Select a nearby system (within 5 hexes) to your target and use this as a forming up point. Send your transports on ahead as soon as they are produced. You will need approximately 40 TR and 60-70 MK II to guarantee success against a well fortified planet: lest your opponent's defence is a bit sloppy. Do not get into a prolonged fight with an enemy space fleet if it would result in your force being reduced to a point where you no longer have a numerical superiority over the target planet's defences.

Ships are very expensive and unless you can partially recover their cost through conquest, occupation and exploitation of an opponent's planet, then you are doomed to eke out a miserable existence in the poorest corners of the galaxy.

## **Some general remarks**

Do not antagonize more than one player at a time. No-one can hold off a determined attack from two opponents, let alone three. It is also a good idea not to get too far in front as this results in you becoming 'Galactic Enemy No. 1' with very unpleasant consequences.

Whenever possible, do your fighting over an opponent's



planet; your own planets are best defended by forcing your opponents to run around defending theirs.

Notwithstanding all these suggestions, experience is, of course, the best teacher. Experiment with the above strategy; it's a good starting point and will lead you into variations and alternatives of increasing subtlety. And don't be surprised if such experimentation really encourages clearer thinking. That's what strategy games are all about.

### What's next

Strategic Studies Group plan to release a game system which will recreate in detail the aircraft carrier battles in the Pacific between 1941-1945. Available in June, 'Carriers at War' will include 6 historical scenarios (Pearl Harbour, Coral Sea, Midway, Eastern Solomons, Santa Cruz and Phillippine Sea) as well as the facility to enter all the data bases to create a scenario of your own design. More on

this project in the next issue, editor permitting. ('Sure do!' Ed.)

### One final thing

On the long weekend of June 9-11, there will be a massive game convention at the NSW Institute of Technology at Ultimo. While most of the events are more conventional games (EG: miniature, board games, roleplaying games etc), SSG will be holding their second RFTS competition. The first, held in Canberra over the January long weekend, was a great success.

Details and entry forms regarding the June RFTS competition can be obtained from either of these sources:

**STRATEGIC STUDIES GROUP**  
Ground Floor. 336 Pitt St. Sydney.  
Ph: (02) 264 7560

**THE TIN SOLDIER**  
2nd Floor. Dymock's Building. 424 George St. Sydney.  
Ph. 27 7421

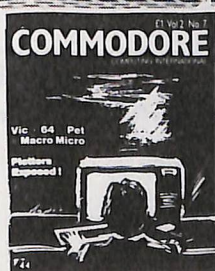
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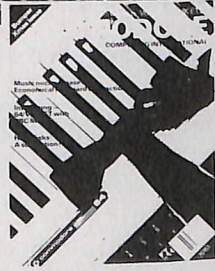


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# Letters to the Editor

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Dear Sir,

Enclosed is a story for the Commodore Magazine if you could use it, I would appreciate a copy of the relevant issue.

Yours Faithfully

M.S. Rychter

## NUMBER PRESENTATION

by Mike Rychter

4 567.98, 1 456 325.86 & 963 742.98 are all easier to read than 4567.95, 1456325.86 & 936742.98.

The following subroutine does this. It takes 'ip' in pennies and creates a formatted output in 'ip\$' which is left padded to 12 characters. The subroutine is therefore able to handle numbers from -999999.99 to +999999.99 (-999 999.99 to 9 999 999.99). See - its much easier with formatted numbers.

```
32100 rem** decimal display *
32105 sp$=" "
32110 ip$=mid$(str$(ip),2):d1$=" ":ifip<0thend1$="-"
32120 iflen(ip$)<3thenip$=right$(000+ip$,3)
32130 j$="."+right$(ip$,2)
32140 ip$=right$(sp$+left$(ip$,len(ip$)-2),12)
32150 fork=2to11step3:j1$=" "+mid$(ip$,len(ip$)-k,3)+j1$:next
32160 fork=1tolen(j1$):ifmid$(j1$,k,1)=" "thennext
32170 j1$=mid$(j1$,k,17-k):ip$=right$(sp$+d1$+j1$+j$,12)
32180 return
```

### Notes:

1. Line 32105 is a general purpose filler which would probably have already been set up in the main body of my program and could be omitted if that is the case.
2. The subroutine expects 'ip' to be in pennies so that a suitable input routine could be-

```
10 input "any number"; ip
20 ip = int((ip*1000+5)/10)
30 gosub 32100
40 print ip$
50 stop
```

3. It is also possible to format the numbers to the older (now out of favour) format using comma's. For example 9 999 999.99 can become 9,999,999.99. To do this the following changes should be made in the program.

```
32150 fork=2to11step3:j1$=" "+mid$(ip$,len(ip$)-k,3)+j1$:next
32160 fork=1tolen(j1$):ifmid$(j1$,k,1)=" "ormid$(j1$,k,1)=","thennext
```

The subroutine is a trifle slow and a machine language version would be nice! Any takers?



Dear Editor,

I am trying to provide worthwhile software to the home user of the VIC 20 at an affordable price. Computers are, in my view, rather like stereograms – the enjoyment is mainly to do with what record you play rather than whether you have 2 tone controls or 10 tone controls. No one would have just 3 or 4 singles to play on their stereo, typically they have hundreds of songs. Amazingly, many VIC owners have just 3 or 4 programs to play on their computer. WHY IS IT SO? I think the high cost of software (typically \$20 for a single program) is the explanation. This is a matter of real concern because it limits the fun and educational benefits which should follow the acquisition of a home computer. Indeed I've heard people say that they (or their children) are now bored with their computer. POPPYCOCK! What they mean is that they are bored with the few programs that they have.

With music the usual way to economise is to buy LP albums rather than singles. I am offering this approach with the VIC 20 programs. Although I charge \$4 for a single game (no extra charge for postage and the tape is guaranteed to run), most of my customers prefer to buy an "album" of 10 games on a single tape for \$20. This effectively reduces the price per game to \$2. This must be the way to bring the home user into an entertaining and ongoing relationship with his computer (\$20 a game hasn't done that except for the rich). Families don't sing around the piano any more but with cheap software they can play around the computer with a new program each week.

..... I produce a mixture of programs – arcade-style games (crossfire, firefox, etc.) educational material (geofun, maths marbles, etc.), intellectual (mastermind, nim, etc.) and curiosities (everlasting calender, burgler alarm).

How do I sell my tapes? Well, I advertise in the classifieds each weekend (Teletrading in Sydney, Melbourne Age, Adelaide Advertiser and the Hobart Mercury). Interested VIC owners phone or write me and I post them the yellow brochure. If they mail me back an order form, I post their tape within 24 hours. A few weeks later I send the second brochure (the green one) to anyone who has purchased a tape.

If you require further information, please do not hesitate to ring me.

With regards,

Arthur Streeter, (ph. 84 6860)  
17 Nelson St Thornleigh N.S.W. 2120

Dear Sir,

RE: HI-RESOLUTION GRAPHICS PROGRAM.

I wish to submit a program I have written, using the hi-resolution screen capabilities of the Commodore 64. In certain areas of the program I have had to insert hand written symbols to make up for the lack of symbols on the typewriter itself, and hope that this program meets with your approval.

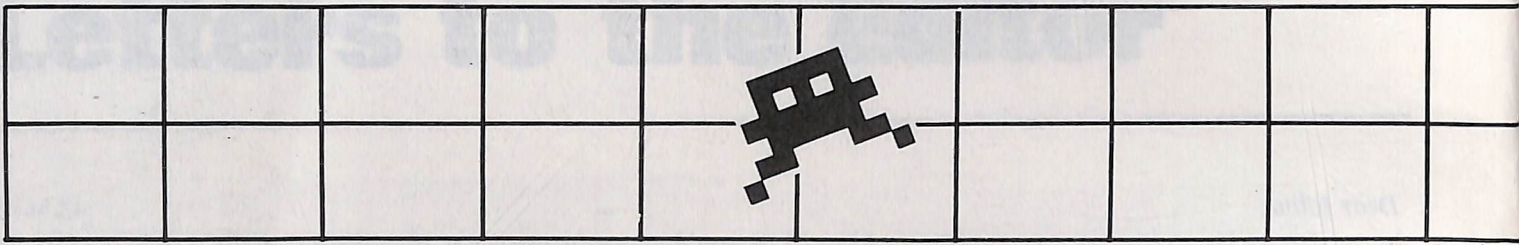
Yours Faithfully,

George Paul Fornet

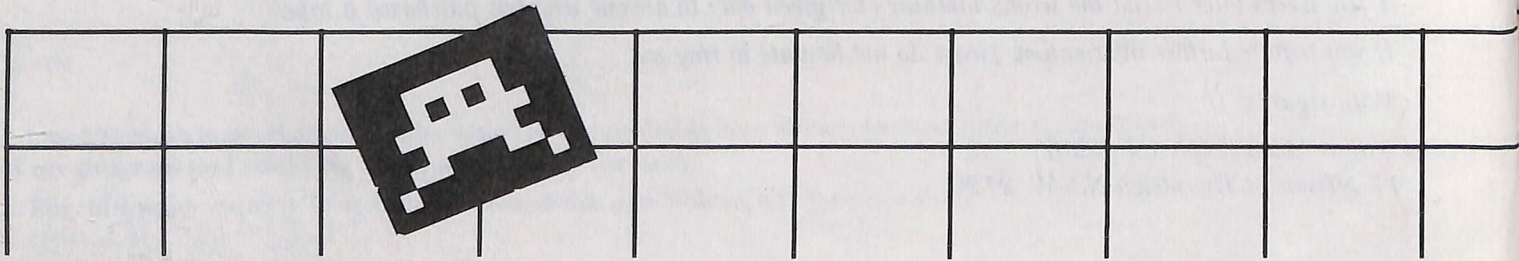
Taralgon, Vic.

See page 25 for the Hi-Resolution Program  
Also page 56 for the continuation of letters to the editor.





# GRAP



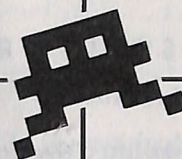
One of the fastest growing areas of interest in computer science and the one that has captured the imagination of the man-in-the-street is graphics.

Home computers such as the Commodore 64 are fast closing the gap on the larger industrial machines in this area. Of course limitations abound: memory, programming capacity, and peripherals.

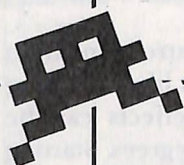
The modern home computerist is fast getting to know such terms as PIXEL, RASTER, SPRITE, HI-LO RES graphics. We are demanding and getting machines that can handle more and more sophisticated graphics.

One of the main limitations is fast becoming affordable: peripherals – high scan





# WOPS



monitors, high quality plotters and analog interfaces. They will come! (we hope). Already the home computer is taking a small but growing percentage of the audio-visual market from its big brothers.

The Commodore 64 is exceptionally good in the graphics department and for its size the VIC-20 shines above many of its more expensive competitors.

We are going to look at some of the graphic packages available for Commodore computers and I believe that many of you may be quite surprised (as I was) at the quality and flexibility that these programs offer.



# Paintpic

BY KIWISOFT FROM THE VIC CENTRE

*Reviewed by Merv Beamish*

PAINTPIC has lifted the Commodore 64 graphics capabilities into the field of fine arts. This package gives the Commodore a vast selection of colour combinations in brushstrokes and graphic shapes.

We'll start from the beginning and unfortunately that is the worst part of it. For such a spectacular program the packaging is bloody awful; a bit of foam with a pseudo cardboard book cover and a photo of a rather poor graphic stuck on the front. Here is a program that sells itself as a state-of-the-arts in Commodore 64 graphics and it looks like it's been put together in the tool shed of someone's back yard. Even the sample graphics - a rose and a space port are rather amateurish compared to the photos that the designers issue, showing just what the package can do.

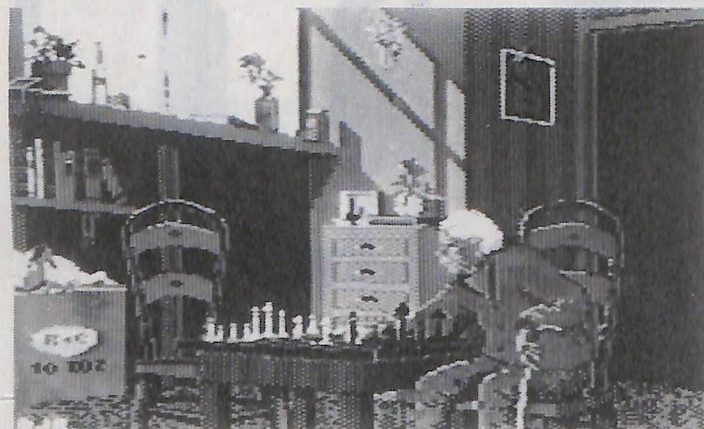
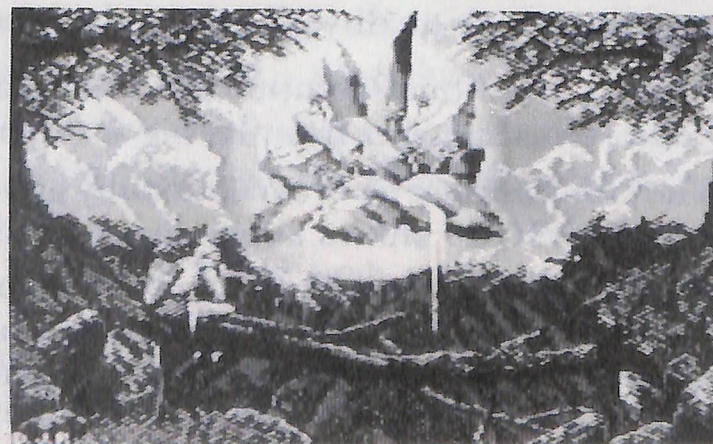


The shape can be filled with colour and parts of them can be deleted at will.

While you are limited to four colours at any one time titled, Background, Top Screen, Bottom Screen, and Colour Memory, it is an easy matter to 'window' areas of the screen and nominate colour alterations within that window thus giving the ability to have a multitude of colour combinations on the screen at any one time.

Additional to the colour combinations the user can design, (or use existing), up to eight different brush strokes to achieve different shading effects including 'Wallpapering'.

Wallpapering means laying one brush stroke next to another and having the designs match just like matching wallpaper designs. Additional shaping effects can be achieved by turning the brush pattern 90 degrees. Starting to get confused? Well I assure you that after one or two goes you will realise just how simple the whole process is.



Things gets marginally better where it comes to the manual. While the manual explains in great detail how to operate the package, it is full of repetition and writing, so patronising that it is hard to read.

Right, that's where the gripes end! From here on in it's just plain beauty.

You can draw with Paintpic utilising eight keyboard keys or alternatively using a joystick.

A wider variety of automatic shapes are available than I've found in any other graphic program. They include LINE, BOX (Square, Rectangle), CIRCLES, PARALLELOGRAM, TRIANGLE, ELLIPSE & ARCS and all are pulled up with the maximum of ease.

Let's have a look at getting up an ARC. First mark the beginning and end points using the "I" and "J" keys, then place the crosshairs at a point that you wish the arc to pass through and type "A" & presto!! In the figure below are three; being a more complicated graphic, can take some time to be drawn. You can abort a graphic at any stage with the SHIFT key.



Other facilities include entering text into your graphics, and thereby I don't mean common old screen type but nice readable designed text. You can mirror images, reduce & expand images, set up perspective lines, automatically determine midpoints, copy shapes & intermix sprite graphics.

You have Pen mode (Hi-Res), Brush mode (Multi-Colour) and Type mode and I believe that they can all be intermingled. Of the user can save and load pictures onto tape.

But you say, it's all very well having this program, when only people with 'Paintpic' can load them and look at

them. Not so say the producers. In the manual (58 pages in length), there is a routine to lift Paintpic off tape without having the program loaded.

The only way to understand Paintpic is to use it and at around \$50, that is not too costly a proposition.

Bye the bye, rumour has it that there is a program coming soon which will enable you to print your design off on a graphic printer.

Main drawbacks (excuse pun), are packaging and manual and the cassette version taking seven minutes to run. But the program is the closest thing to a true electronic paintbox I've ever seen.

## FIRST INDICATIONS OF PRINTPIC

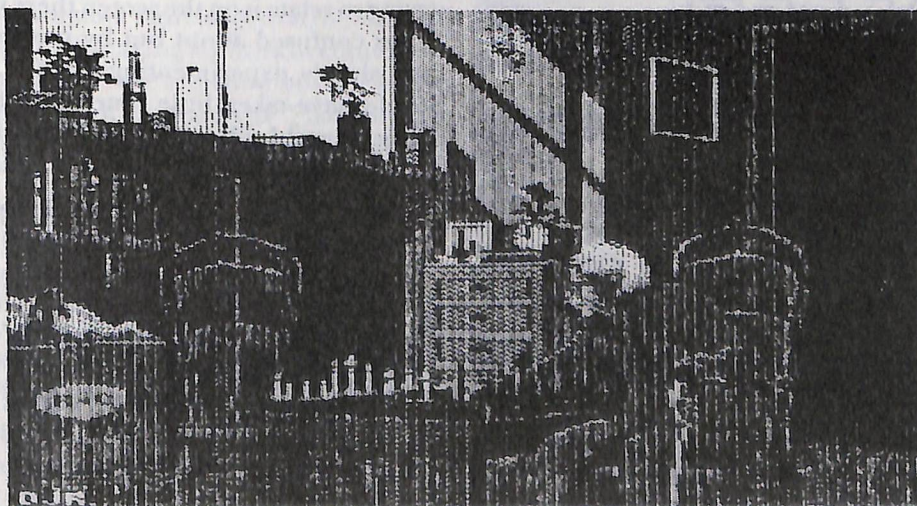
The program is intended to be a definitive printing program in much the same way as Paintpic is a universal drawing tool. It will do at least the following:

- print Paintpic pictures in 5 grey shades with optional picture frames.
- do colour separation prints.
- do "paint by numbers" outline prints.
- do graphic plot prints.
- do hooked rug design prints.
- convert any microneye picture image to Paintpic form.

A picture image will also be included.

The producers recommend a microneye camera\* and think that the microneye and the C64 computer together with Paintpic and the printing program will make a complete computer aided drawing and design (CAD) system at very low cost. ■

\* BYTE, October 1983, Pg 316





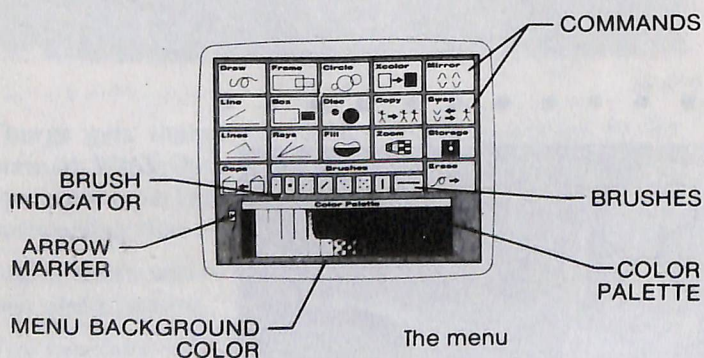
# THE KOALA TOUCH TABLET and THE KOALA PAINTER for the Commodore 64.

Reviewed by Harry Perlich.

I must point out at the very start of doing this review on the Koala Painter that I was chosen to do it, due to the condition that I had virtually no knowledge of the operation of the Commodore 64. It was seen that the merits of the Koala Painter would therefore be more objectively qualified if a person who had no previous knowledge of 64 procedures was able to operate the device with ease and without assistance. Although the more experienced computer user ought to find it very practical.

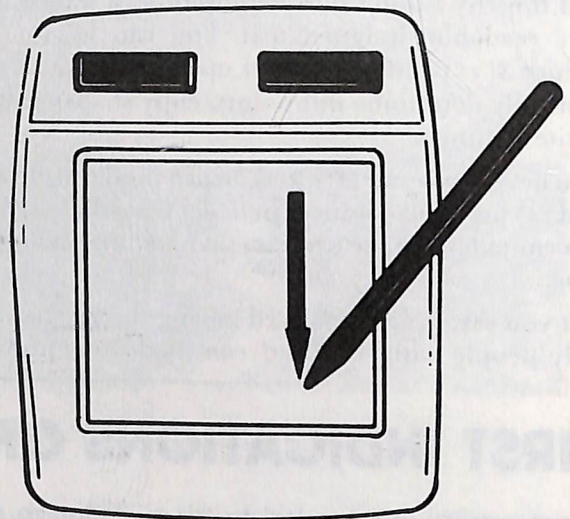
The Koala Painter uses the Koala Touch Pad for its control 'palette'. The Koala Pad is a brilliant piece of engineering. It enables total control of the program, is compact, connects into the user port on the Commodore 64 and best of all can replace the joystick at a relatively inexpensive price. Koala Painter is not the only program available for the Pad. I was informed by Ozisoft that there are many more programs that will soon be available (possibly by the time the magazine is published).

Koala Painter is the program that comes with Koala Pad and is an excellent one to demonstrate the enormous potential that this piece of hardware offers. I began viewing the screen menu, with the small instructions booklet in my hand. it took only a few minutes before I began to understand the procedures involved in creating pictures although it was some 2 hours before I had mastered all the menu options.



The menu, which is the first thing that the Koala Painter displays on the screen has pictures and descriptions of all the function options to choose from. For example DRAW, FRAME, CIRCLE, LINE, FILL, ZOOM and others.

The first possibility being 'DRAW', I entered it as per the instructions booklet and moved to the 'drawing phase'. This meant pointing my finger, or the touch pen provided onto the Pad position relating to where the draw image appeared on the screen, then pressing a black button to verify the choice. This brought me onto the picture frame; the full screen area on which I could now 'draw'.



The koala touch tablet

Having gotten this far, with just a few difficulties I began to gain confidence, and felt that the whole process was quite easy. I was keen to continue and create some proper images. It flashed through my mind, and this is an idea that many other people have probably already had, that this device is the way to a new artists medium. Much as photography was once ignored and then accepted as a valid means of artistic expression perhaps this too is a possibility, certainly for the novice or child. Also I could just see children playing with Koala Painter and parents so relieved that no real paint is being smeared on the furniture.

Anyway, when reading the instruction booklet and then trying to relate it on the screen there were a few things that I was confused about but by putting the booklet down and simply experimenting a little, it became easier. It would have taken little time indeed if someone already knowledgeable about the Pad had given a brief demonstration. Unfortunately this was refused me.

Some of the first interesting and useful commands that I came across were FRAME, BOX and CIRCLE. With these it was possible to go to my canvas (the screen) and draw on it as usual, except this time when I moved the cursor up or down on the Pad a frame or circle would expand along that point with the cursor. Thus it was not necessary to draw these things simply by eye. If I had a rectangle or circle of the desired size, I merely pressed the black button on the pad and its size became fixed. I could use my pen (which moves the cursor) to move the created figure around the screen to any point I wished and fix it there by pressing the black button a second time.

Each time that I tried a new instruction on the Pad I had a



little difficulty with the instruction. Simply by going to the screen and experimenting it took only a few moments for a function to become self explanatory.

Take for example the 'MIRROR'; with this function you can duplicate in each corner of the screen, whatever you have in the corner in which you are positioned. If you are drawing a box in the top left hand corner you will get an identical box in each other corner (four in all). This becomes very useful when drawing patterns that require symmetry or repetition.

The 'XCOLOR' allows different colours to replace a previous choice, indicate which new colour you require on the menu 'palette' (choice of 16 colours and 16 patterns and combinations). Although it is possible to erase this choice if you wish, by pressing the 'OOP'S' command.

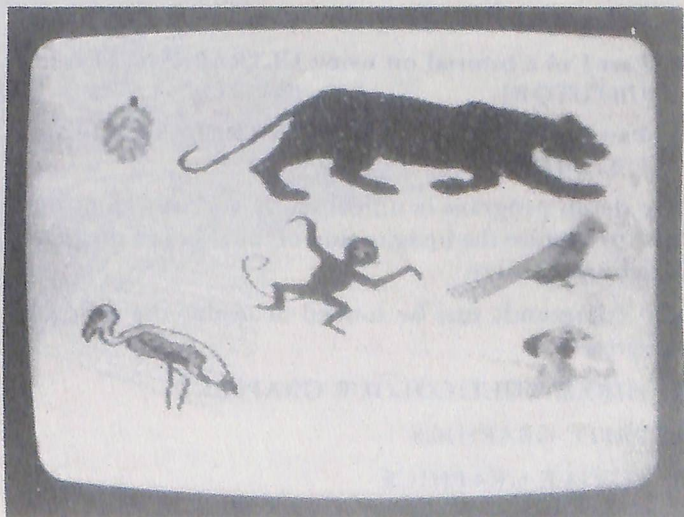
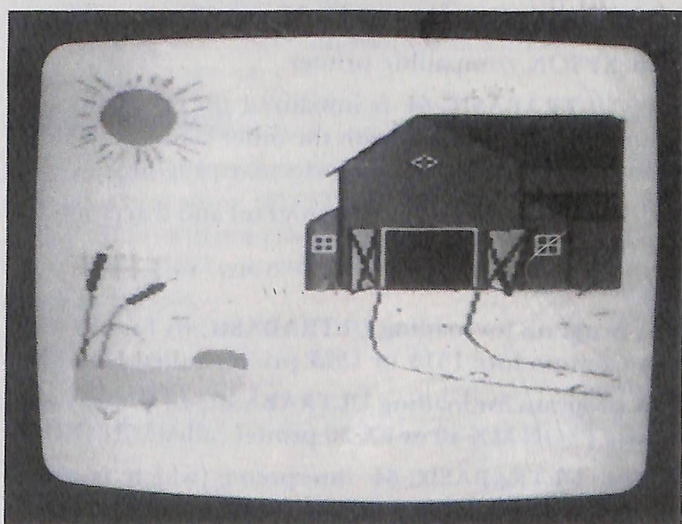
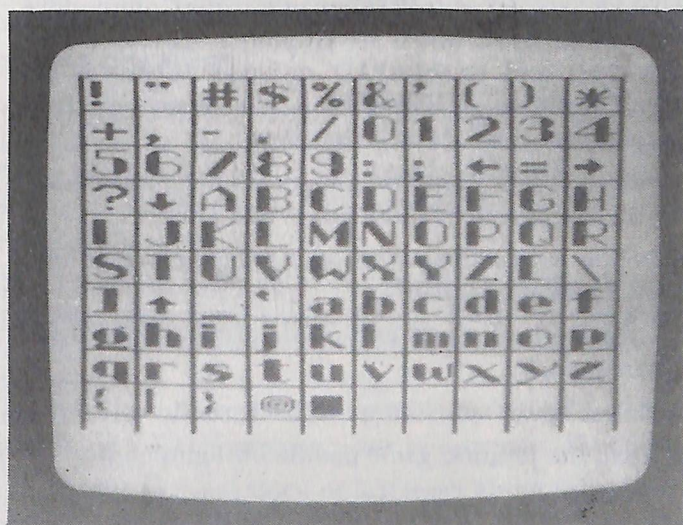
Having tried all these different possibilities for some two hours of doodling, I came across the 'ZOOM' command. This one was truly the most fascinating. It allows you to hold a box around any section of the picture then enlarge that part of the screen so that you can work on it. You can use any colour with ease to create little multicolour dots in that section. Thus every single part of the picture can be given minute detail, so that a whole painting can be created.

After 'ZOOM' came 'COPY' another useful feature. With this, you are again able to take a certain part of the screen of your choice and reproduce it at any other position, as many times as you wish.

Finally the 'SWAP' command. I envisage that this one will be used when your picture making abilities become more ambitious. It allows you to take a section of your screen (call it screen A) and take it to screen B. That way two pictures can be worked upon at the same time and then interchanged.

If you then wish to keep a 'drawing', the menu allows you to simply 'STORE' it on disk.

The more I think about it the more variety there is in it. The whole concept cannot be faulted by me, in the variety and possibilities. I anticipate using my developed skill to do some carefully composed multicolour drawings. ■



Examples of graphics already available on the menu



Reviewed by Merv Beamish

# ULTRABASIC-64

ULTRABASIC-64 adds 50 commands to the Commodore 64 the majority of which are graphic in nature. Unlike PAINTPIC and KOALAPAD reviewed in this issue, ULTRABASIC-64 permits you to actually store graphics in a program form. It make it easy to:

- ★ Plot in either high resolution or multicolour modes. You can plot dots, lines, boxes and circles.
- ★ Define and manipulate sprites in either high resolution or multicolour modes.
- ★ Create sound effects and music using any all of the three voices.
- ★ Detect sprite/sprite or sprite/background collisions.
- ★ Read the joystick, game paddle or: lightpen ports directly.
- ★ Draw using a very friendly set of TURTLE graphic commands.
- ★ Get hardcopy of the graphics screen on a Commodore or EPSON compatible printer.

Once ULTRABASIC-64 is initialized the 20 additional commands may be used with the other standard BASIC commands to create quite spectacular programs.

The commands work both in program and direct mode. The complete package includes:

- ★ User's guide.
- ★ A program for loading ULTRABASIC-64 for use with a Commodore 1515 or 1525 printer called UBCBM.
- ★ A program for loading ULTRABASIC-64 for use with an EPSON MX-80 or FX-80 printer called UBEPSON.
- ★ The ULTRABASIC-64 interpreter (which is automatically run by one of the above inializers) called ULTRA.
- ★ A demonstration program called UBDEMO.
- ★ Part I of a tutorial on using ULTRABASIC-64 called UBTUTOR1.
- ★ Part II of a tutorial on using ULTRABASIC-64 called UBTUTOR2.

The demo program is unfortunately very slow and does little to capture the imagination of the user but the power is definately there.

The commands can be looked at under the following categories:

- ★ HIRES/MULTICOLOUR GRAPHICS
- ★ SPRITE GRAPHICS
- ★ TURTLE GRAPHICS
- ★ GAME FEATURES
- ★ OTHERS

## HIRES/MULTICOLOUR GRAPHICS

To start you need to initialize the screen with HIRES a,b or MULTI a,b (a,b refers to screen and border colours). These commands can be programmed direct.

From here you have all the facilities at you finger tips to: PLOT; BOX; FILL; draw automatic geometrical shapes and free form graphics (all in either HIRES or MULTI-COLOUR mode. There is the facility to mix text and graphics and with a command TIC place grid points, in any of 16 colours, around the perimeter of the screen. The TIC pointers can be varied to whatever X,Y, proportions you require.

Some typical graphic commands are.

- ★ CIRCLE x,y,r,c – draw a CIRCLE

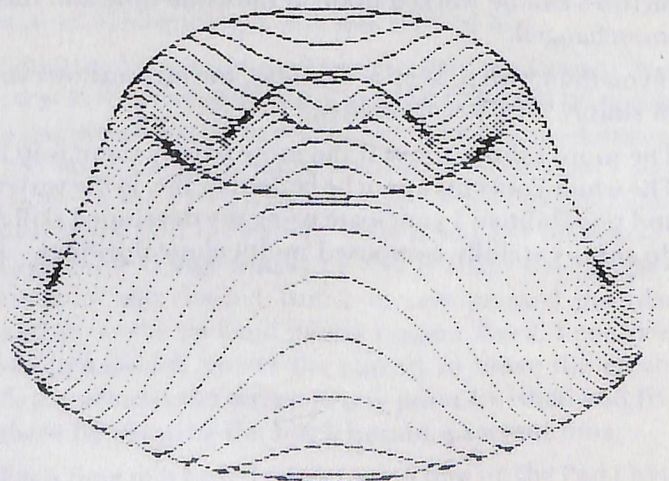
This command draws a circle of the specified colour with the center at the point specified by a and y. The radius of the circle is given by the r value. (x – the x-coordinate of the centre of the circle; y – the y-coordinate of the centre of the circle; r – the radius of the circle; c – the colour of the circle.)

- ★ MODE a – set MODE of display

This command controls the plotting mode for all commands. There are three modes:

0 – (MODE 0) This is the normal mode of operation. It is automatically set by the HIRES or MULTI commands. In this mode, the selected point(s) are turned on.

1 – (MODE 1) This is the erase mode. After this command is executed, all plotting turns the specified point(s) off, erasing them from the display. the point is made the same colour as the background colour.





**2 - (MODE 2)** This is the reversing mode. When this has been set, if a point is initially off, it is turned on. If initially on it is turned off. This mode may be used to erase part of a display by displaying it a second time. It is also useful to draw a pattern which will be visible, even though it crosses other points that are turned on or off.

Gamers will like the function **PIXEL**. Like the **BASIC** function **INT**, **SIN**, **PEEK**, the **PIXEL** function returns a value depending on the colour at the point designated by the **X** and **Y** co-ordinates

### Screen Control Commands

Four useful control functions are available:

**DUMP** - Save graphic display to tape or disk

**GREAD** - Load graphic display from tape or disk

**NORM** - Return screen back to normal (**BASIC TEXT**).

**GRAPH** - Switch screen to graphic display.

### SPRITES

**ULTRABASIC** includes **SIX SPRITE** control commands, making it easier to achieve animated effects and also permitting the **SPRITE** to move out beyond the normal screen area.

Control is offered over both **HIRES** and **MULTI** colour **SPRITES** allowing programmed colour control expansion and Rotation

Here - Also a number of **SPRITE** collision functions available.

### TURTLE GRAPHICS

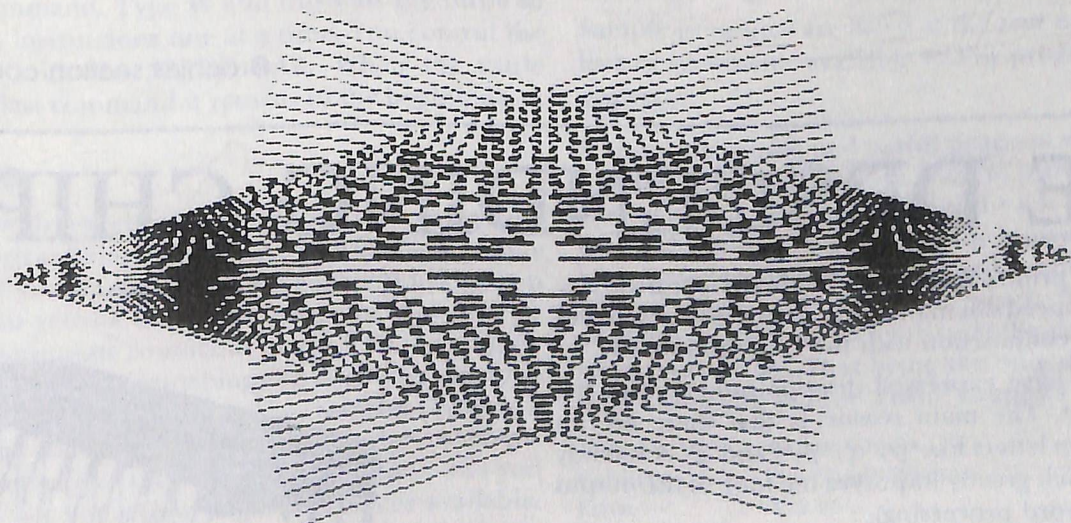
**ULTRABASIC-64** includes **TURTLE** graphics. The turtle is a colorful creature that can move about on the screen. The turtle carries a pen and is capable of leaving a trail as he moves about. **TURTLE** commands instruct the turtle to turn and move.

The turtle normally starts in the center of the screen, pointing towards the screen (north). Turns are specified in degrees (0-360). A positive number turns the turtle in the clockwise direction. A negative number turns the turtle in the counter-clockwise direction. There is also a command which turns the turtle to a specific direction.

The turtle can erase, draw or just move about the screen and like a chameleon change colour at will (your will). Turtle graphics is an ideal way to introduce computer graphics and the **NINE ULTRABASIC** commands can be intermingled with other ultrabasic and standard **BASIC** commands on the 64.

### GAMES FEATURES

A small section but very interesting input functions are utilised when using **JOYSTICK**, **PADDLES** or **LIGHT PEN**. **JOY (P)** will read the position of Joystick port (P) i.e. 1 or 2. The value returned will be the sum of the position plus fire button.





For example if the joystick were being held in the southeast direction and the fire button was being pressed, the value would be 2 (South) = 16 (Fire button) = 26.

Game features also include TIMERS making it very convenient to keep track of the duration of different events. Ten times (called counters) are available, commands are:

SCTR c,v – set counter

c = counter number(0-9)

v = value to set counter (1-65000)

CTR(c) – read counter

c = counter to be read(0-9)

### SOUND FEATURES

There are three sound generators in the Commodore 64. Each is designated by the number - 1, 2 or 3. To make it easy to use, ULTRABASIC-64 sets up generator 1 to be a standard square-wave, 2 is set to a sawtooth waveform (reedy sound) and 3 is set up as a noise burst sound. The tone characteristics of each generator may be changed by the GEN and VOL commands.

In all there are six fairly sophisticated sound commands that would take an article by itself to explain.

### OTHER FEATURES

Because there are often times when a pattern must be repeated (especially when using TURTLE graphics commands), the repeat commands have been included.

They allow you to repeat a pattern by the number of times you specify also to interrupt and stop the repeats if you require.

Commands are also available take hard copy of the graphics screen or generate a hard hard copy direct to printer (COMMODORE or EPSON dot matrix)

### FURTHER COMMENTS

ULTRA BASIC 64 is one of the most powerful BASIC add-ons on the market. It does not disable BASIC commands and error messages.

The additional command can be used direct from keyboard or within a program. One of its major assets is its ability to hardcopy graphics.

Unfortunately at times HIRES GRAPHICS can be tediously slow but the ability to program in advance allows you to leave the C64 to its own devices while you go and have a cup of coffee.

The big disadvantage, of course, is that you can only write programs for other people with ULTRABASIC-64 unless you can make copyright arrangements with the authors.

Roy Wainwright and Abacus have come up with some good packages but this one must be one of their best for the general user.

Title:	ULTRABASIC-64
Author:	Roy Wainwright
Publisher:	Abacus Software
Price:	(t) \$44.00 (d) \$48.00
Sample from:	Vic Centre. 416 Logan Road, Stones Corner. Qld. 4120

Graphics section continued over

## THE DESCENDING CHIP

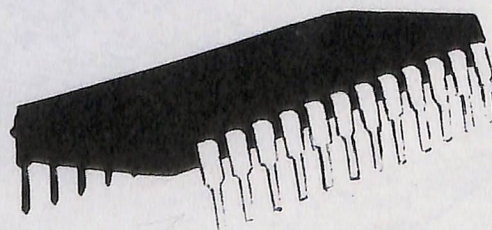
The MPS 801 printer from Commodore is a sturdy, low cost medium speed dot matrix printer currently enjoying good sales in conjunction with the Commodore 64.

Many people have expressed disappointment with the lower case set. The main reason is that there are no 'descenders' on letters like 'p', 'q', 'y', 'j' and 'g'. A remedy is at hand, which greatly improves the look of the output (particularly word processing).

A substitute ROM is available which can be quickly and easily substituted for the present character chip. By swapping the old ROM for the new the cost is kept low.

Available from Compuchart: 35 Calder Cres. Holder ACT 2611 (062) 88 3584

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# TURTLE TRACKS

A review by Wayne Hodges

## 'DEVELOP SOME SPARKLING DESIGNS'

The first thing that you are aware of is the well packaged set which comprises a comprehensive instruction book, storage box and cassette tape.

Just what is 'TURTLE TRACKS'? How does it work? Let's start from the beginning, as you open the first page of the instruction book you discover a well composed little handbook just ready and waiting for you. First pages instruct you how to load 'Turtle tracks' into your computer, with a page of instructions on how to use the book. The next thing is we will move through this book step-by-step.

## SECTION 1: Getting on Track.

This section deals with using the cursor, deleting; running through the various commands that you will use with this program. Such as Draw forward, running, line numbers, turns and new. At the completion of each section you will find a few challenges for you to complete, a revision exercise based on the completed section. Lesson 2 continues with more facilities which are available in this program, such as the colour command (i.e. c=40), with a colour chart displaying the various combinations. Jumping forward is a very snappy command which permits the turtle to jump forward, and to jump backward you insert the minus symbol, Amazing!

## LESSON 3: Loops.

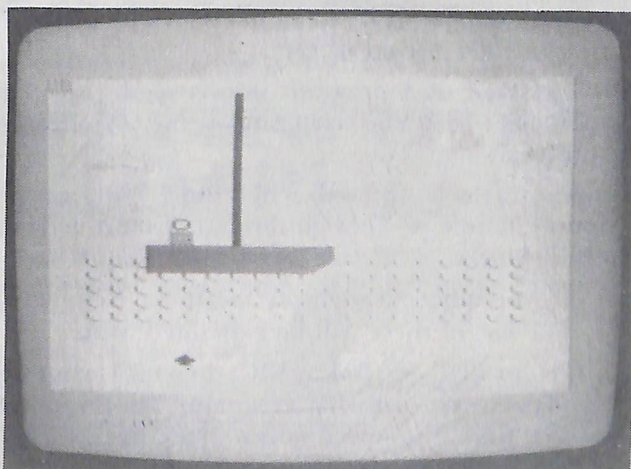
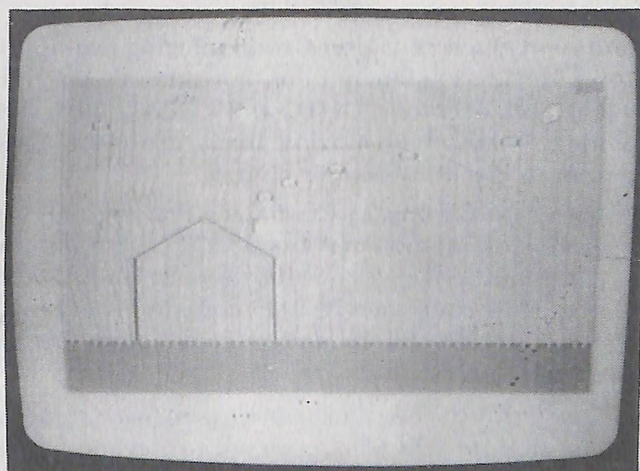
By typing N you clear the turtles memory, then you are ready to start the next program. By inserting the command GT1 the computer reacts like a dog chasing its tail. This facility reveals quite a few possibilities. An excellent command is WALK. You can examine loops more closely with this command. Type W and this tells the turtle to carry out its instructions one at a time. You control the turtles pace with the SPACE BAR. When the turtle reaches the last command it returns to the beginning. A useful tool.

## Section TWO

Continues with excellent instruction, discussing line numbers, such as being able to use decimals. For example just suppose you wanted to draw a square. Luckily, you don't have to rewrite the whole program. You merely insert the appropriate command. e.g. 2.5 TR (turn right). Good eh!! It goes about describing and providing examples about different commands in this section. Lesson 5 examines how to change the character design. A simple statement and whizzo this neat little handbook tells you how and shows you a few pages of choices available. Neat!!

Lesson:6. Reveals the world of sound and colour facilities available for you in this program set.

With further instructions on SAVING AND LOADING;



writing long programs, and a whole host of CHALLENGES for revision, which are listed at the end of each lesson, You're set to go!!

Sample programs are listed at the rear of this book with lists of statements available to this program.

## FINALLY

A most interesting and useful program which has much to offer the younger person (easy to learn because of the easy to read instruction book) or the not so young person too. This little packaged program is presented in a little box, cassette tape, and well defined handbook. However, 16K of memory is required, which probably is not available to everyone. (8K will be sufficient until about 65 statements or so). That being the only drawback, it is a most colourful, unique Turtle Graphics program.

Title:	Turtle Tracks
Publisher:	Scholastic Wizware
Price:	\$29.95
Sample from:	Ashton Scholastic
	PO Box 579 Gosford. NSW. 2250

Graphics section - Continued on page 48



# A BACKGROUND TO BASIC -

## Part 2 THE GOSUB DEBATE

The continuation of an interesting series on the background to BASIC.

PAUL BLAIR

A comment at a recent User Group meeting prompts me to provide an explanation of how the C64 handles GOSUB (and, of course, GOTO and THEN) – all of which provide a method of moving freely around a BASIC program to the lines of your choice.

I thought I should check just what it is that beginners find in their documentation of about BASIC program storage. The C64 handbook gives no clues as to how a BASIC line is stored in the computer. Neither does the Programmer's Reference Guide. So, a simple explanation becomes more extensive.

I will use 65XX to describe the main processor chips used by Commodore. The 6502 powered earlier models (and the Apple too, of course). The C64 uses a 6510 chip, which is very similar to the 6502. So, rather than type '6502/6510' all the time, I'll just say 65XX.

BASIC storage of a program line is made up of two components – the line itself, and some 'management' add-ons.

Assume you have entered a new line. How does the computer handle it? Let's go through a short version of how it all works.

First off, two adjacent memory locations (bytes) are set aside. The use of these will be explained soon.

Your C64 (or PET or CBM or VIC) then takes your input line, and parses it to see what it contains. The line number is handled first. It is stored in two bytes, in classic 65XX style. The number, say 1000, is divided by 256 – eg  $1000/256$  is 3 with 232 left over. The computer stores these numbers in adjacent bytes of memory in reverse order – first the 232 then the 3. For simplicity, this is described as 'low byte/high byte order'. Quite a lot of 65XX storage is done in this way.

The next section to be parsed is the BASIC line itself. In a future article I will describe this process. For now, accept that the line is tidied up and stored. To mark the end of the line, a zero is put there by the computer.

At this stage, the line looks like:-

0 0 232 3 (BASIC line) 0

Now the computer knows where the next line will start by counting the number of bytes used for this line and adding one to get the start. The starting position in RAM is treated like the line number – divided by 256, the remainder remembered, and the two bytes that represent the start of the next line are known. The bytes are now put at the start of the line, where the two blank bytes were set aside. If the RAM start is at location 3000, then  $3000/256$  (ie 11) and 184 (the remainder) are stored, in low/high byte order again.

The line now looks like this:-

184 11 232 3 (BASIC line) 0

The computer uses the last entry (184 and 11 – called the 'link' bytes) for all sorts of tricks. The bytes tie a BASIC program together, and allow the computer to manage itself efficiently, even finding the next line to execute!

What happens at the end of your program? Well, there is no 'next line', so there is no next line number. In this case, the link bytes are set to '0'. When the computer finds two zeroes in the link byte store, it's found the end.

If you think about it for a moment, the end of a BASIC program is followed by three zero bytes – the zero on the end of the last line, and the two zeros in the link bytes that follow.

You will find graphical representations of BASIC storage in various books – most books on the CBM/PET (eg 'Pet Personal Computer Guide' by Strasma) have a pretty diagram illustrating all of this.

Now, having introduced the topic at some length, the nub of this article:

The comment at the User's Group meeting referred to program optimisation by putting frequently used sub-routines at the start of a program. The theory behind this is that the GOSUB routine always goes to the start of the program to find its target line. Half right, but not a complete explanation.

What really happens is that BASIC takes a look at the current line number it is executing, and compares it to the target line given in the GOSUB, GOTO or whatever. This comparison has been implemented differently in the C64 to previous CBM computers, which only compared the high bytes of the line numbers. In the C64, the routine at \$A8A7 works on both high and low bytes, but the effect is nearly the same.

If the target line number is less than the number of the present line being executed, then the operating system goes back to the start of BASIC and begins to hunt forwards for the target line. It would be nice if BASIC could hunt backwards but it doesn't. If the target line number is greater than the line being executed, the search starts from the present line. The difference between the previous routine and (which compared only the high bytes of the respective line numbers) and the C64 routine is that the newer routine works to a greater degree of accuracy by checking both bytes.

If you haven't fallen asleep by now, it will be obvious that BASIC splits a program into two sections when it encounters a GOSUB – everything up to the present line, and everything beyond it. If the target line is in the first part, its back to the start for search purposes. Otherwise, start the search from where the program line occurs.

So the rule seems to be self-evident. Either put your routines at the start of the BASIC program, thus ensuring



their speedier access. But if that can't be done, then put them as close as you can to the last place from where they are called in your program.

## HOMework

Having told you all, it's time for homework. Let me pose the problem, which is the corollary of my explanation. Having gotten to the target line and done all it had to do, how does the program get back to the line it 'went' from?

Some clues might be handy. When the GOSUB is encountered, BASIC takes the two bytes that represent the line containing the command, and stores them away. When it encounters 'RETURN', it gets them back. Does BASIC then start searching from the very start of the your program to get back to where it came from? If so, is it still

wise to to put routines very close to the start of the program where they will slow down the RETURN command? Puzzle on that one for a while and give your answer to the next User Group meeting.

Perhaps someone would like to perform an experiment to prove (or disprove) the theory of all this. Set up a program with the subroutine at the very start, followed by a couple of dozen 'REM' lines. Then follow a line with a GOSUB in a FOR...NEXT loop, using perhaps a thousand repetitions. Use the C64 clock to time execution. Now, turn the program around to have the program line first, then the multiple 'REM' lines, then the subroutine. Time it again. Finally delete most of the 'REM' lines and do the last test again. interesting isn't it?

## MELBOURNE HOUSE NEWS RELEASE

Melbourne House has recently announced that many of its new Commodore 64 programs will shortly be released to include a great new fast load system titled Pavloda. The Pavloda system is developed specifically for the Commodore 64 which enables cassette programs to be loaded at the same speed as programs from disk. This increase in speed allows cassettes to load up to six times faster than before!

The first of their programs that will be available with Pavloda are Horace goes Skiing (now available), Galaxy and Classic Adventure. Pavloda will be advertised nationally during June and is expected to create a great deal of interest among dealers and consumers alike. A program using Pavloda will be as convenient as a disk but at the much more affordable price of a cassette!!

For further information please contact:  
Sue Anderson (03) 690 5336

## DEFINITIONS COMPETITION

Starting this issue we intend to run a competition that will encourage people to write to us and to add some extra humour to the pages of the Commodore magazine. The nature of the competition is as per the examples shown below, just to save making a complicated explanation.

We must give credit to 'The War Machine' newsletter for the idea and also for the use of these examples. They should get you enthusiastic. An extract from their competition: "...There appears to be a great deal of hostility out there to all aspects of the home micro industry; the impression is of useless software and defective hardware supplied by a bunch of crooks....".

We are offering Instant Lottery tickets at random to the entries. Please submit your entries to the editor, (see page 1 for address).

### Startling Graphics

We've just mastered machine code!

### 15 levels of play

Infantile, jejune, amateurish, purile, boring, simplistic....

### Real-time simulation

How the hell do you slow down machine code?

### Adventure

Genuine risk of starving to death waiting for the next level to be set up.

### Editorial

A chance to say why this issue was late.

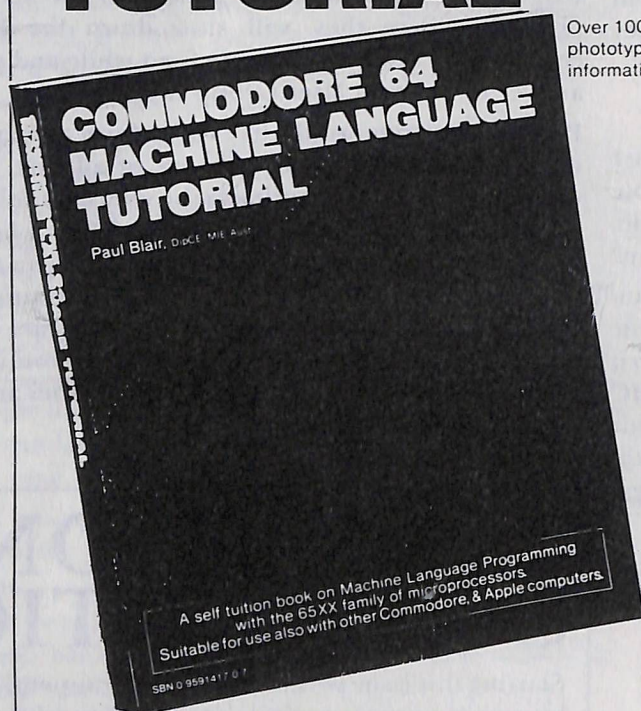
### Competition

If you can't afford to fill the magazine, get the readers to send you free copy.



# COMMODORE 64 MACHINE LANGUAGE TUTORIAL

by Paul Blair DipCE, MIE Aust.



Over 100 (150cm x 210cm)  
phototypeset pages full of  
information and program listings.

## WHAT COMES AFTER BASIC:

BASIC has become the universal computer language for home and personal computers. To the computerist it soon becomes apparent that speed is BASIC's main drawback.

That's where MACHINE LANGUAGE (ML) comes in. By removing the intermediate interpretation of step BASIC, the computer can run hundreds, if not thousands of times faster. For tasks like sorting, searching and some graphics, ML is the fastest (and probably the only satisfactory) way of programming. All tasks that require a large number of repetitions of whatever type – that is where ML will win hands down. You will also find that judicious use of ML permits larger or more complex programs to reside in the limited memory space of a micro computer.

**PAUL BLAIR** has distilled his own starting experiences in learning ML into a set of TUTORIALS to ease the transition from BASIC to ML. The layout of the book is designed to provide self tuition and guidance in the simple use of the principal 6500 microprocessor family ML instructions. A computerist will gain confidence to continue further into the language.

To assist discussion about ML programming, the book contains a complete program listing for the Commodore 64 (C64). There is a similar program available for the CBM/PET 4000 series of computers. As the Apple computer is also based on the 6500 family, Apple users can also learn from it. The point of the program is illustrative, and study of it will quickly demonstrate many of the points made in the text.

**OPTIONAL** additions to the book are the cassette and disk copies of the program listings in the book. The book has pockets to hold these items.

**WRITTEN AND PUBLISHED IN AUSTRALIA**

**THE AUTHOR**, Paul Blair (DipCE, MIE Aust), is a professional engineer in the field of national road policy. Computing interest started in the sixties when he commenced writing structural design programs in FORTRAN IV. In 1979, he moved into writing custom software. Involvement grew as did international contacts which include Canada, U.S.A., England, New Zealand and the Netherlands. Paul has had items published in most of these countries and is a regular contributor to the Australian Commodore Magazine. He is a strong supporter of computer user groups and is constantly called upon for demonstrations and tutorials in schools and other institutions.

A second or follow up volume to this book is already being formed.

## ORDER FORM: I/We wish to order the following items:

COMMODORE 64 ML TUTORIAL	\$ 19.95		
ACCOMPANYING CASSETTE	\$ 10.00		
ACCOMPANYING DISKETTE	\$ 11.50		

Book must accompany cassette or disk.

Postage & packaging \$3.00

Dealer enquiries contact: Holt-Saunders (02) 439 3633

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(02) 439 1827

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☐ Please charge my BANKCARD/VISA/MASTERCARD .....

Expiry date..... Signature.....



# BOOK REVIEWS

MERV BEAMISH

## USING THE COMMODORE 64 IN THE HOME and COMMODORE 64 PROGRAMS FOR THE HOME.

It is interesting when two publishers send us two books both to cover the same area. Such is the case with 'USING THE COMMODORE 64 IN THE HOME' from Prentice-Hall Australia and 'COMMODORE 64 PROGRAMS FOR THE HOME' from Holt-Saunders Publishers.

I do not want to state that one is better than the other but rather to see the similarity or otherwise between the two different approaches.

**PRESENTATION.** Both books have neat, attractive covers and while '...IN THE HOME' is better in its quality of paper and, to my mind, presentation, the '...FOR THE HOME' is larger in size and content. So I believe that they balance out.

'...FOR THE HOME' divide their 40 odd listings into nine sections: Financial; Household Helpers; Other Household Helpers; For the Home Worker; Children's Work and Play; Schoolwork; Outside Activities and Recreation; and For the Commodore 64 User.

'...IN THE HOME' split their twenty odd programs into 'Commodore 64 in the Study' and 'Commodore 64 in the Playroom'.

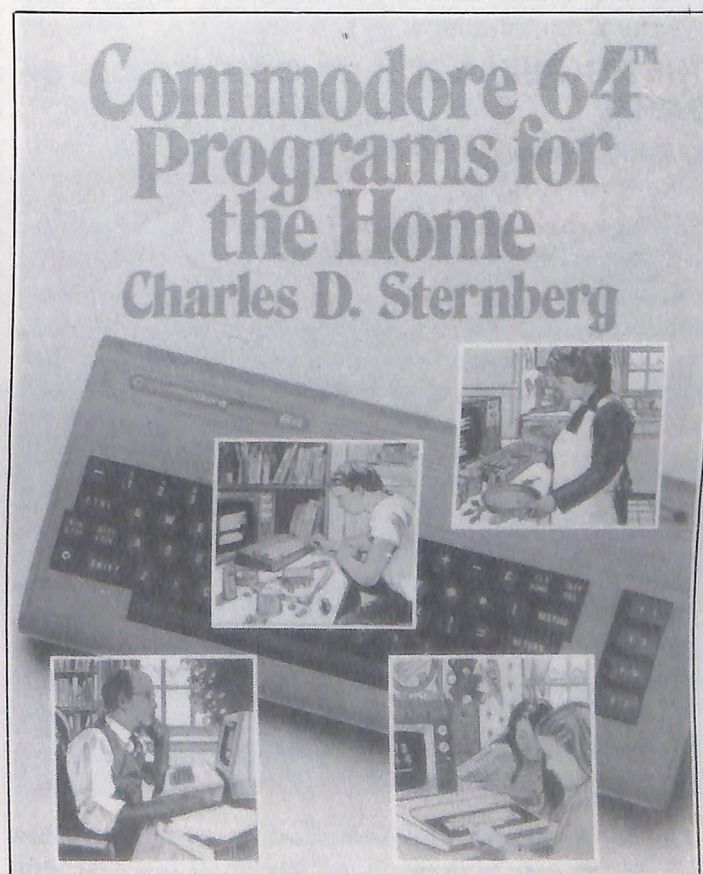
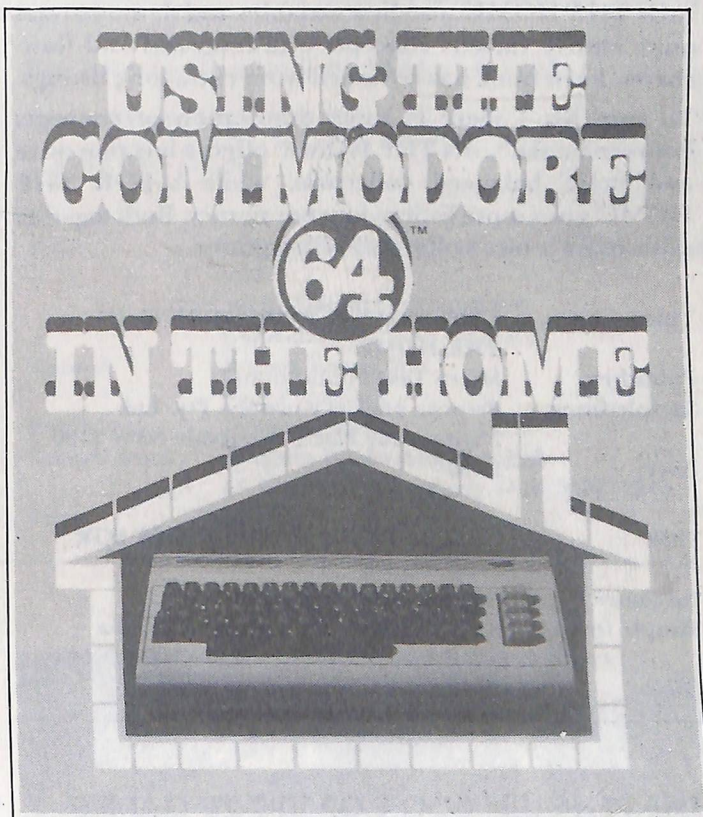
Of the programs, both have dietary or nutrition programs. A selection of mortgage and money handling listings and data storage programs. Each have some mathematics training routines for the children.

From here on in the difference in approach becomes evident, '...FOR THE HOME' tends to move off more in the direction of: diaries; telephone and birthday lists; and chore scheduling; A much more practical side of things even to the extent of a listing to calculate pocket money earned on a paper run.

'...IN THE HOME' tends to offer a more balanced selection, 50% practical and 50% entertainment. Not the usual shoot-em-up and get out of the lounge room while I'm playing sort, but some quite new ones. Hangman, Breakout, Frogger and Attack the Alien are not here.

There is Swordmaster where you duel (using joystick or keys) for the survival of your country and king. Wildlife Warden, where you balance the foodchain and control hunters in an effort to protect the Wildlife. There is also a real Charles Darwin special with Mutation Maker.

Each book has a couple of nice little additions in the layout. '...FOR THE HOME' clearly lists in a box, at the end of the programs, all variables and functions used. This is a real asset and there is also an effort made to clearly describe the program with readable REMs, in fact the programs in this book are very clear and readable.





'...IN THE HOME' also lists variables and demonstrates quite clearly various concepts with diagrams and flow-charts. Each book has refrained from extra long listings. To sum up – there is some duplication of concepts between books. '...IN THE HOME' offers a less repetitive and more balanced collection, while '...FOR THE HOME' gives more listings for your money. Both together offer quite a nice collection of programs.

Title: USING THE COMMODORE 64 IN THE HOME  
 Publisher: Micro Text Publications  
 Sample from: Prentice Hall of Australia Pty. Ltd.  
 7 Grosvenor Place, Brookvale NSW 2100  
 Price: 17.50

Title: COMMODORE 64 PROGRAMS FOR THE HOME  
 Publisher: Hayden Book Company  
 Sample from: Holt-Saunders Pty. Ltd. Of Australia  
 9 Waltham Street, Artarmon NSW 2064  
 Price: \$23.95

## 'THE PENGUIN BOOK OF VIC-20 GAMES'

by Paul Copeland. and

## 'THE PENGUIN BOOK OF COMMODORE 64 GAMES'

by Robert Young and Paul Copeland.

review by Barry Wayne

We have two computer books just released from Penguin, with games for both the VIC-20 and COMMODORE 64.

You soon discover after browsing through either of these rather colourful covers that both publications are basically the same, with much the same games presented in each book, with a couple of additions.

The introduction in each, proclaims 'A sense of excitement,' and that 'Paul Copeland has done his best to make the most of the colour, sound and graphics potential of the VIC-20'.

Obviously we are not looking to criticise both books, which have been identically reproduced for both machines, but merely evaluating the worth of these publications for the consumer. With so many similar books already available, do these two little efforts from Penguin provide anything for use.

### 'THE VIC-20 GAMES BOOK' – THE PROGRAMS YOU DRAW

The introduction to this little effort states 'This program allows the user to draw on the screen'. It is a neat little

program, ideal for children, it is a rather neat example of what the VIC can do. Input commands are used to construct drawings by one key strokes.

Another is ..... NOUGHTS AND CROSSES.

A nicely constructed old standard, hardly 'ARCADE TYPE' graphics, but very entertaining, ..... if you like noughts and crosses. (8K versions also available here).

REVERSI

Another version of this old game – VIC-20 style.

LIFE

You are in charge of a colony of cells which live and die at your whim.

### OTHER SELECTIONS

GAMBLERS DELIGHT – for the gambler at heart, a poker machine to play with.

OIL RIG – You are an oil baron, a clever game.

RED ALERT – Clever effort, out of this world.

AL KHWARIZMI – A brain teaser, that will stretch you.

SYMBOL MATCH – A VIC-20 version of concentration.

MUSIC SEQUENCER – Allows you to compose and store music sequences.

A rather varied and original collection, with some old faithfuls that have re-appeared yet again, however they are well presented, the program text is understandable and well explained.

'Is that all?' you say, well no it isn't. The author has added a collection of subroutines that I think you will find useful.

The following are presented:

1. MENU SELECTION BY CURSOR CONTROL
2. MENU CONTROL BY FUNCTION KEYS
3. FAST CURSOR POSITIONING
4. DIET HELPER
5. RUNS PER OVER

What they have given us is a collection of interesting subroutines that would provide a useful addition to your programs. Also at the end of the book there is a collection of game ideas for you to work on, and create your own games – some great suggestions here.

### 'THE COMMODORE 64 GAMES BOOK'

In this book we have much the same as the VIC-20 book, with the following changes:

### EVOLUTION – PENULTIMA

This is an expanded version of LIFE (presented in VIC-20 GAMES)



# HI-RESOLUTION GRAPHICS

GEORGE PAUL FORNET

**TEN PIN BOWLING** – Another with very effective visuals.

**RUNAROUND AND MAGIC SQUARE** – Two games to test you and taunt you effectively. Two mental teasers.

**CAT AND MOUSE**

**FLIP**

**HANGMAN (NO GRAPHICS)**

**BREAKOUT**

The C64 version is rather disappointing in that it doesn't use the quite considerable capabilities that exist in this machine, however the games that are presented are workable, effective and entertaining.

## FINAL WORDS

In conclusion, both publications offer much, providing you do not expect spectacular graphics. What you will get

in each book is a suitable collection of entertaining games.

Referring to the introductions in each book:

**SATISFYING.....YES**

**EXCITING .....NO**

Title:	THE PENGUIN BOOK OF VIC 20 GAMES and THE PENGUIN BOOK OF COMMODORE 64 GAMES
Author:	Robert Young and Paul Copeland
Publisher:	Penguin Books
Sample from:	Penguin Books Australia Ltd. 33 Cooper Street, Surry Hills NSW 2010
Price:	\$12.95

## 'GETTING THE MOST FROM YOUR MICRO.'

by Ernest E. Mau *Reviewed by Wayne Hodges*

Another publication from the Hayden Book Co. of New Jersey, U. S. A. , comes at a time to fill a much needed gap in the microcomputer field. What does the book have to offer? To quote: 'Preventing unnecessary equipment failures so those that do occur are due to things beyond our direct control. Another is eliminating practice and procedures that lead to failures as a result of improper operation; Negligence or outright carelessness; a third is reducing the seriousness of a failure when it does occur by implementing methods to minimize lost work and information. The fourth involves finding ways to return the computer to operational status with speed and as little out-of-pocket expenses as possible.'

To ascertain if this book does attain these heady objectives will be as soon as we examine this rather text book sized publication.

This author also makes the statement 'To save money, to reduce you time and to alleviate the annoyance you'll experience when your machine goes down'.

Quite a claim indeed! Does this book produce the goods? Well, to reach this conclusion we'll need to examine the chapters and the areas covered in this publication.

### CHAPTER ONE

Sets the basic ground rules, it examines the author's problems with a microcomputer system. He then sets out to look at various areas of thought and basic understanding. This chapter sets the rules and shows you what to expect to occur with your system.





## CHAPTER TWO: SYSTEM COMPONENTS.

This chapter bisects the computer and examines closely the components that make up the system.

- i. The Central Processing Unit (CPU)
- ii. The Memory
- iii. Input/Output devices
- iv. The Keyboard
- v. Printers
- vi. Storage devices

This chapter is fashioned so that it is easily understood with much information relevant to the novice or can be revision for the more advanced user.

## CHAPTER THREE: 'THE SEVEN DEADLY HAZARDS.'

The author sets out seven things that 'contribute to excessive system malfunctions.'

He explores through the list of hazards that follow:

- Dirt and contamination
- Heat build up
- Electromagnetic fields
- Electrostatic charges
- Power disturbances
- Wear and tear
- Mishandling

Each hazard is discussed with the source and causes; effects, and suggests Preventative and remedial effects.

A most important chapter for the serious user, which contains much to ponder for the efficient operation of your microcomputer.

## CHAPTER FOUR: 'MAINFRAME' COMPUTER.

In this chapter, the author presents information and procedures directly affecting the Mainframe. He also identifies useful products, without endorsing any, only offering different types for consideration. Warnings and cautions are examined, and goes on to explain the importance of Diagnostic Systems; Card and circuit level maintenance. He offers information that is critical to the running of your system. The procedures are clearly set out and can be used efficiently and effectively.

## CHAPTER FIVE: KEYBOARDS, DISPLAYS AND TERMINALS.

Communication with your computer is usually with the keyboard and video display. In this chapter these devices

are dealt with by the author and shows how, with reasonable care and attention, you can minimize some problems.

## CHAPTER SIX: PRINTERS.

Here the author describes printer set-up controls, care and repair of your printer. A well defined and illustrated chapter.

## CHAPTER SEVEN: MASS STORAGE.

An examination of mass storage devices and magnetic media systems. Descriptions of various types which are available and their functions. CHAPTER EIGHT: CHAPTER EIGHT: MAGNETIC MEDIA AND SOFTWARE.

He examines proper care of the Magnetic media software (Programs and data). The rules are offered and other types of contamination which effect these systems. This chapter also shows effective care and maintenance of magnetic media and software.

## CHAPTER NINE: POWER CONDITIONING.

Power conditioning is studied, with the accent on power problems, basic preventative steps. A complex area which is well covered here.

## CHAPTER TEN: INTERFACING

'Interfacing is a critical requirement for the operation of your system, when it comes time for you to correct some new equipment to your system'. The author presents information; areas of difficulty; pertinent facts; and a new products list to assist you.

## IN CONCLUSION

After examining this publication I now realise how it can be most effective for the person who is considering the aquisition of a Microcomputer system, whether it be for home or small business area. This book by Mr. Ernest E. Mau offers much.

I consider this publication to be a must if you are contemplating this rather large step. Well done Mr. Mau. Good value indeed.

Title:	GETTING THE MOST FROM YOUR MICRO
Author:	Ernest E. Mau
Publisher:	Hayden Book Company
Sample from:	Holt-Saunders Pty. Ltd. of Australia 9 Waltham Street, Artarmon NSW 2064
Price:	\$23.95

Continued on page 37



# HI-RESOLUTION GRAPHICS

GEORGE PAUL FORNET

```

1 POKE53265,PEEK(53265)AND239
2 POKE53270,PEEK(53270)AND247
5 POKE53265,PEEK(53265)OR32
6 POKE53272,PEEK(53272)OR8
7 FORX=8192TO16191:POKEX,0:NEXT
8 FORI=1024TO2023:POKEI,16:NEXT
9 POKE53265,PEEK(53265)OR16
10 X=160:Y=100
20 GETA$:IFA$=""THEN20
30 IFA$="D"THENX=X+1:Y=Y:GOSUB 200
31 IFA$="X"THENX=X:Y=Y+1:GOSUB 200
32 IFA$="W"THENX=X:Y=Y-1:GOSUB 200
33 IF A$="A"THEN X=X-1:Y=Y:GOSUB 200
34 IF A$="Q"THEN X=X-1:Y=Y-1:GOSUB 200
35 IF A$="C"THEN X=X+1:Y=Y+1:GOSUB 200
36 IF A$="E"THEN X=X+1:Y=Y-1:GOSUB 200
37 IF A$="Z"THEN X=X-1:Y=Y+1:GOSUB 200
38 IF X<8THEN X=X+313:Y=Y
39 IF X>=313THEN X=X-313:Y=Y
40 IF X<0THEN Y=Y+199
41 IF X>=200THEN Y=Y-200
42 IF A$="S"THEN7
43 IF A$="O"THEN65
44 IF A$="N"THEN60
45 IF A$="P"THEN75
46 IF A$=CHR$(133)THEN240
47 IF A$=CHR$(134)THEN80
48 IF A$="H"THEN95
49 IF A$=CHR$(135)THEN300
55 GOTO20
60 FOR I=1024TO2023:POKE I,2:NEXT
61 GOTO20
65 POKE 53270, PEEK (53270) OR 16
70 GOTO20
75 POKE 53270, PEEK(53270)AND239
76 GOTO20
80 R=Y/2:H=X:K=Y
81 FOR I=1TO360
82 T=I*PI/180
83 X=R*COS(T)+H
84 Y=R*SIN(T)+K
85 IFX<8THENX=X+313:Y=Y
86 IFX>=313THENX=X-313:Y=Y
87 IFY<0THENY=Y+199
88 IFY>200THENY=Y-200
89 GOSUB200
90 NEXT
91 GOTO20
95 FORI=1024TO2023:POKEI,16:NEXT
100 GOTO20
200 CH=INT(X/8):RO=INT(Y/8):LN=YAND7
210 BY=8192+RO*320+8*CH+LN:BI=7-(XAND7)

```

## DIRECTIONS &amp; INSTRUCTIONS

A = LEFT

D = RIGHT

W = UP

Q = DIAGONALLY UP LEFT

E = DIAGONALLY UP RIGHT

Z = DIAGONALLY DOWN LEFT

C = DIAGONALLY DOWN RIGHT

S = CLEARS EXISTING PATTERN

(Approx. 20 sec. wait to begin again.)

O = MULTI-COLOUR SCREEN

P = BACK TO HI-RES. MODE

N = CHANGES BACKGROUND TO RED

H = CHANGES BACKGROUND TO BLACK

F1 = ENDS PROGRAM

F3 = DRAWS CIRCLE (see note below)

F5 = See note below

\*F3:- The circle radius is established by the 'Y' Co-ordinate, i.e. if the 'Y' co-ordinate is near the top of the screen, the circle will be smaller than if the 'Y' co-ordinate was near the bottom of the screen.

\*F5:- Has two functions; when pressed the first time the F5 key allows you to create spaces using the controls listed above. When you wish to resume drawing, merely press F5 again, and the drawing will begin where the space ends. This control will not function during the circle mode.

Note:When the program is executed, a blank screen will appear until it is ready to draw, and at the same time the computer will go into a 38 column mode.

To check for errors in the main program body, run the program from line 10 and execute a few of the commands.

No pattern will appear but any errors will come up and be readily identifiable.

Continued on page 56.



# PILOT for the Commodore 64

article by A. Koppenhaver/S. Murri from: commodore - the microcomputer magazine; May 1983

Today we are faced with sophisticated students who demand challenging computer applications and exciting graphics. PILOT for the Commodore 64 combines the unique features of the Commodore 64 with the power of the PILOT language, thus producing the most powerful tool available for the creation of quality educational software. The Commodore version of PILOT includes the abilities to define your own characters, create colourful movable objects called sprites, and to create music and a variety of sound effects.

PILOT for the Commodore 64 is a language that allows teachers to create their own Computer Assisted Instructional (CAI). With PILOT, educators can write their own educational software, combining fun, entertainment and learning. "PILOT frees the creative teacher from the problems associated with programming and courseware development. PILOT allows teachers to develop their own educational courseware specifically related to their own instructional strategies." Programs previously written in COMMON PILOT can be run with PILOT for the Commodore 64 without converting any code. Also, a "run only" version of PILOT, PILOTR, is included on the PILOT for the Commodore 64 disk. PILOTR is identical to PILOT except that programs can only be loaded and run (i.e., the user cannot create, edit, print, or save PILOT programs when running PILOTR). PILOTR is especially useful when teaching students with previously written PILOT programs.

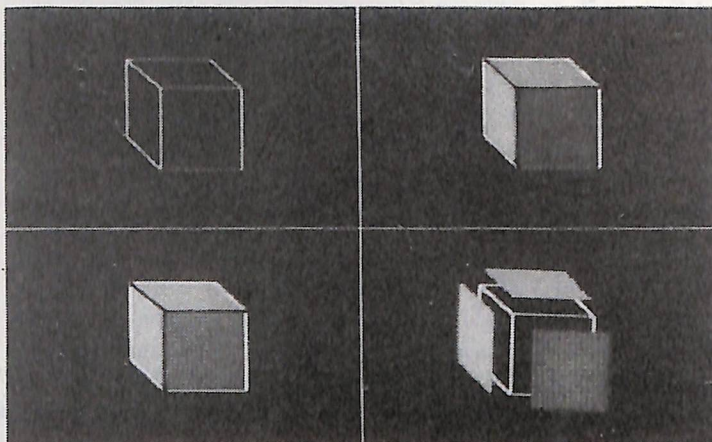
PILOT is a full-scale computer language containing a complete and powerful instruction set. This provides the flexibility to program virtually any application. There is also a provision for integrating your own machine language subroutines. Using subroutines, external devices such as video-tape or laser-disk can be linked to the PILOT system.

The PILOT system consists of four modes:

- EDIT** - To create and edit PILOT programs
- RUN** - For program execution
- IMMEDIATE** - To enter individual instructions and view the results on the screen
- COMMAND** - For loading, storing, and printing programs

A maximum of *two keystrokes* is required to access the different PILOT modes. Press RUN/STOP to enter the COMMAND mode before accessing any of the three modes. To enter the EDIT, RUN, or IMMEDIATE mode, simply input the mode's first letter.

Every learning situation requires some form of two-way communications. The PILOT system was designed to create programs that interact with students in a non-threatening, friendly manner. PILOT programs have the

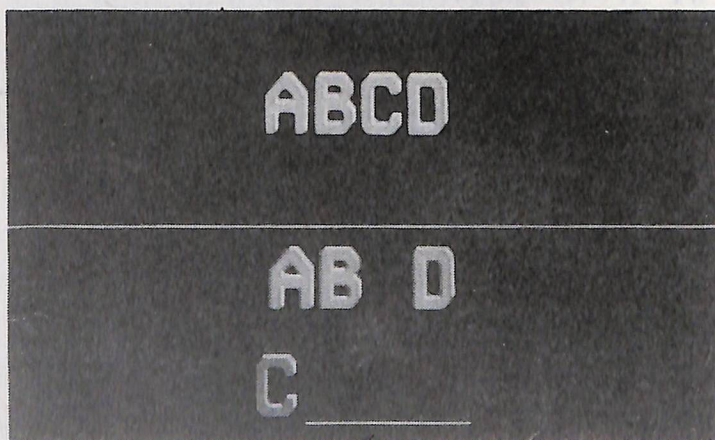


Use PILOT's graphics commands to draw lines.

Next, sprites are used to form the panels of the cube.

Sprite animation is used to create movements on the screen.

The labels on the panels show PILOT's ability to combine high-resolution graphics and text on the same screen.



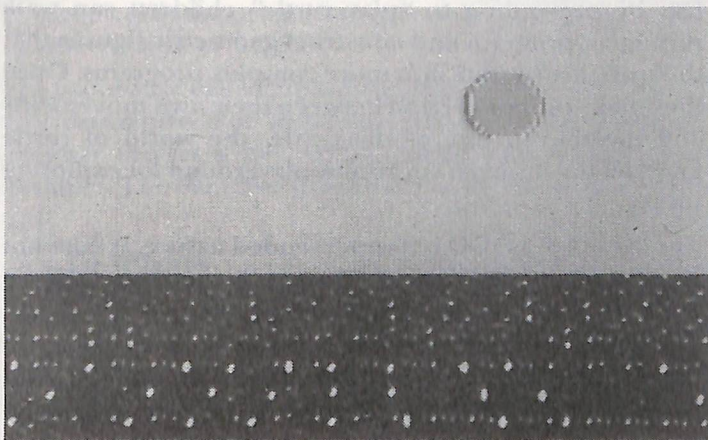
Eight sprites make up these four letters, created using Commodore PILOT. Each letter uses two sprites overlaid to create a three-dimensional effect.

Here the two "C" sprites have changed location and colour.

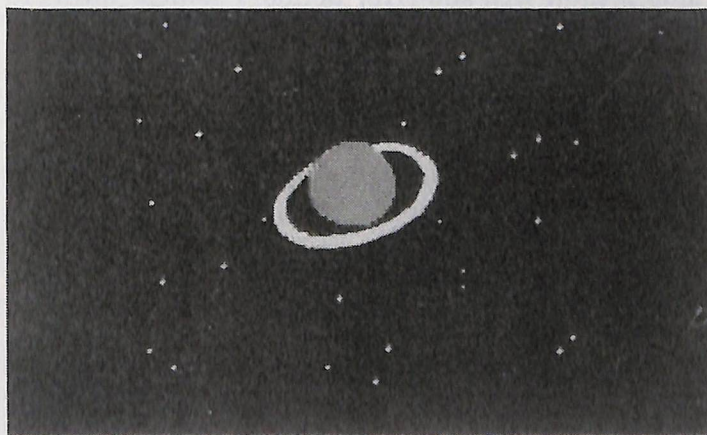
flexibility to determine what the user is *trying* to say, regardless of the spelling or sentence structure. Also, PILOT programs are advanced enough to determine if the user is close to an answer; thus, PILOT can provide a series of conversational *hints* to direct the students to the correct answer. By interacting with the computer through a program created with PILOT, the student is *learning* as he or she goes along. This is in direct contrast to the conventional one-way quiz, in which answers are either right or wrong.

PILOT is also beneficial to the teacher and offers substantial recordkeeping capabilities. A PILOT program can keep





Using Commodore PILOT, we first split the screen to create the effect of a "horizon". Then programmable characters are defined and placed on the screen to create the city lights effect. The moon is made up of two sprites.



Combine sprites using PILOT to create a planet and use programmable characters for the stars.

track of the number of times it takes a student to reach the correct answer, as well as maintain records of each student's score to monitor their progress.

You may have perceived PILOT to be only a text-based language. . . .this is not so. Graphics are essential parts of effective instructional programs and PILOT includes several features to accomplish this. Text and graphics can be displayed simultaneously in any combination of sixteen colours. Graphic images can be created through use of plot, draw and fill features. You can even split the screen in a variety of locations to create "window" areas for specific purposes.

Thus far, we have discussed the features of PILOT in a very general way. Now let's take a look at the features which make PILOT for the Commodore 64 the most powerful version of PILOT available.

PILOT for the Commodore 64 allows you to easily program your own characters. This feature provides enormous flexibility in the creation of graphic displays. Programmable characters are especially important for those applications that require specialised notation. This includes language, science, and mathematics.

Your graphic capabilities are further enhanced with the ability to easily create and use sprites. Sprites are graphic images that you define and can move anywhere on the screen. Especially suited for video graphics and arcade-type animation, a maximum of eight sprites can be displayed on the screen at any given time.

Sprites can be single-coloured or multi-coloured and can be expanded in the horizontal and/or vertical directions. Sprites can be combined to create large, colourful displays. Also, to give a three dimensional effect to an image, sprites can be assigned priorities which enable them to pass in front of or behind either each other or background data. Included on the PILOT disk is a "sprite editor" program which allows you to easily create and view sprites before using them in your PILOT program.

PILOT on the Commodore 64 allows you to create an immense variety of sounds and music by providing full access to the 6581 Sound Interface Device (SID). Sound is thoroughly explained in the PILOT manual, which includes music note values, charts, and a register map. Also included is a discussion of bits, bytes, and registers, which must be understood in order to use this feature. The PILOT package also contains a sample "sound editor" program that allows you to experiment with various sounds that may be fun to include in your programs. The sound feature is strictly an enhancement and is not required to effectively use the PILOT program.

In summary, there is no other language more suited to the educational environment than PILOT for the Commodore 64. The interactive features of PILOT, in combination with the unique features of the Commodore 64, make this package the most complete and effective instructional aid available. ■



# LOGO A language for everyone

article by Jim Bussey from: Commodore - the microcomputer magazine; May 1983

LOGO is currently available for the Commodore 64 and, in addition to turtle graphics, will include word-list manipulation capabilities. It will be distributed through Commodore dealers.

In his book, *Mindstorms: Children, Computer and Powerful Ideas* (Basic Books, 1980), Seymour Papert, the developer of LOGO, explains the two fundamental ideas behind his work with children and computers:

"...The first is that it is possible to design computers so that learning to communicate with them can be a natural process, more like learning French by living in France than like trying to learn it through the unnatural process of Australian foreign-language instruction in classrooms. Second, learning to communicate with a computer may change the way other learning takes place." LOGO is a computer language developed over a 12-year period by Dr. Papert, his colleagues at M.I.T. and other researchers around the world. It was designed to combine discoveries in artificial intelligence with the learning theories of the educational psychologist, Jean Piaget, and is often used as a "first computer language" for children. The term LOGO comes from the Greek word for "thought", a fitting term for a language dedicated to teaching thinking through problem solving.

Although LOGO is often used as a programming language for young children, it is certainly not limited to that use. In fact, it can have applications for graduate students in computer science, as well. This is because, although it is very simple to learn initially, LOGO is also limitless in its ability to explore complex mathematical relationships and ideas. As a result, it can be used to teach computer programming, computer literacy and for specific applications in many subjects, including mathematics, music, language arts and the sciences. However, its most notable purpose (pardon me if this sounds too lofty) remains to teach people how to solve problems – even complex abstract problems – by drawing on their concrete experience of the world.

Piaget's research indicates that even very young children have theories about how the world works. Using this information, Papert sought to create an environment in which children could explore their theories of the world and use them as a basis for learning. He developed LOGO so children could use a computer to solve problems by drawing on their own personal experience – namely their understanding of their own physical movements.

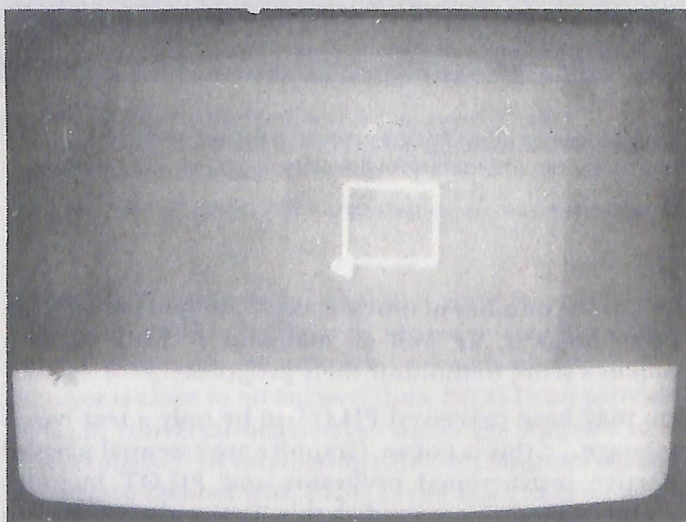
LOGO does this through the use of a "turtle", a computer-controlled graphic character that has two characteristics – position and heading – each of which may be controlled independently. Children program the turtle to move on the screen by figuring out how they themselves move. In

fact by pretending to "play turtle" children can walk through a program and construct geometric figures that they can incorporate into more complex programs. Once they make the connection between their own movements and the movements of the turtle, the world of turtle graphics opens up an enormous playground for exploring ideas.

The beauty of LOGO is its open-ended nature. It does not lead to "right" or "wrong" answers. It simply provides a method of pursuing interesting problems – problems that can become increasingly difficult as the level of competence increases. The LOGO environment is ideal because it allows children to set their own goals and measure their own progress as they create programs. It also helps develop a high degree of critical thinking, especially when the children must debug and refine these programs.

Using the LOGO turtle, children build increasingly sophisticated programs by defining shapes, then using these shapes to define more complex shapes. For example, after a short trial-and-error period a student learns to draw a square:

```
To square
Forward 50
Right 90
Forward 50
Right 90
Forward 50
Right 90
Forward 50
```



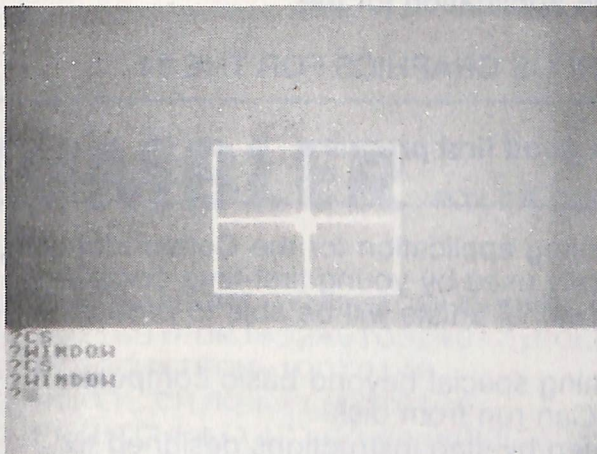
The term "To" tells LOGO to enter this procedure called Square (it could have been called anything) into the language's list of terms that can be used in other programs.



In other words the programmer is creating his or her own unique version of LOGO.

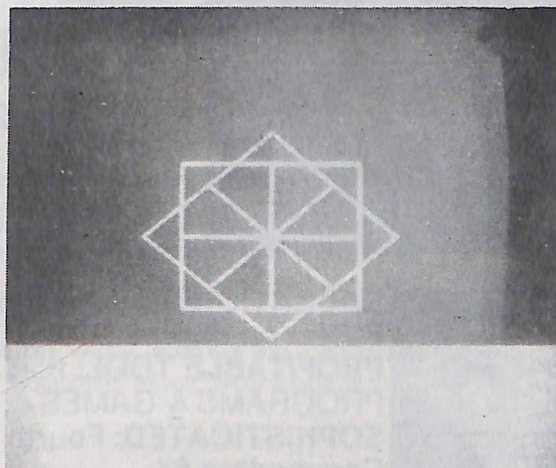
The procedure called Square can now be used to create a new procedure. For instance, combining four squares together creates a new shape, which you might label, Window. The Window procedure would be defined like this:

```
To Window  
square  
square  
square  
square
```



A simpler way of writing this program would be:

```
To Window  
Repeat 4 [Square]  
End
```

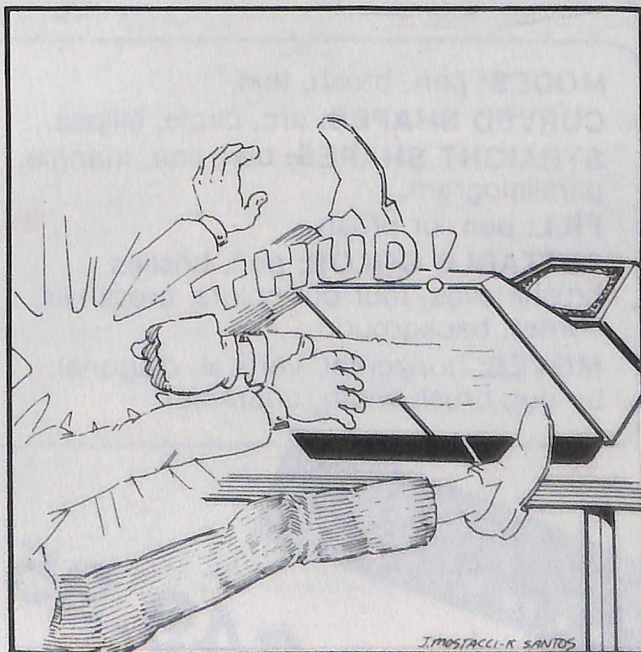
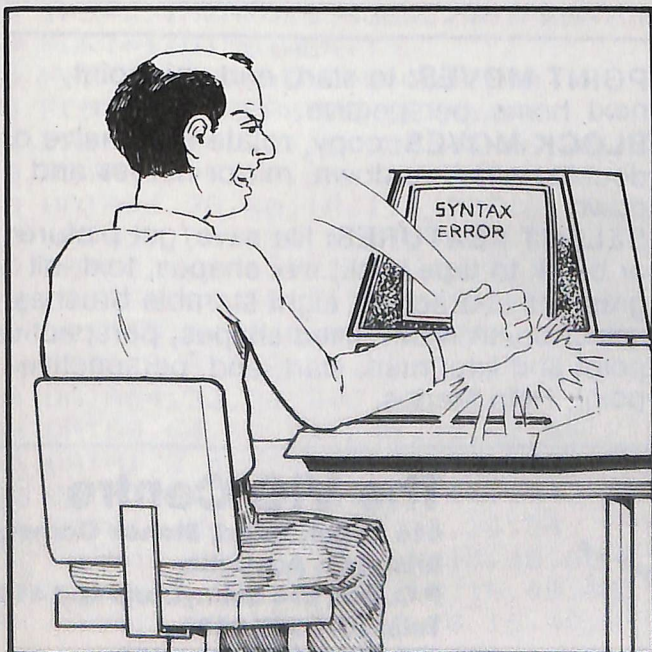


Then, using the procedure Window, you could:

```
To Flower  
Repeat 20  
[Window right 20]r
```

Writing programs in LOGO becomes fun as students begin to see the potential for creating different shapes. Since there are no right or wrong shapes students can test their theories, receive immediate feedback and acquire a sense of their own accomplishments as they program and debug combinations of increasingly complex procedures.

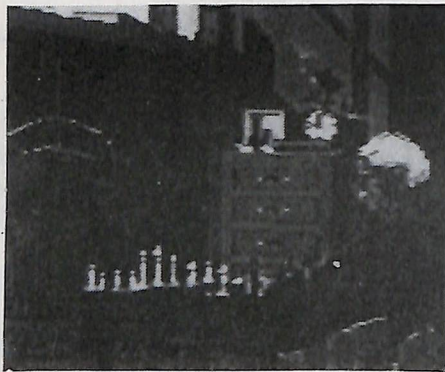
This is necessarily a very brief synopsis of what LOGO is and what it can do. If you would like to gain a more thorough understanding of how LOGO is being used, there are several books currently available on the subject. ■





# PAINTPIC™

## SUPER ART FOR THE COMMODORE 64



by

**KIWISOFT™**  
PROGRAMS



*"There's nothing like it!"*



**EDUCATIONAL ART:** Art the modern way. For ages 12 and up.

**FUN:** You design it, PAINTPIC does the work.

**PROFITABLE TOOL:** PUT PAINTPIC PICTURES IN YOUR OWN PROGRAMS & GAMES.

**SOPHISTICATED:** Fourth generation application for the Commodore 64.

**REVOLUTIONARY:** THE END OF CRUDE GRAPHICS FOR THE 64

**Step by step instructions, a good first program**

**PAINTPIC** is a complete color drawing and painting application for the Commodore 64, using multi-color bitmap. It is designed to be easily used by young first-time computer enthusiasts. It also provides so much that professional artists will be able to produce publishable work.

**PAINTPIC** requires no joystick, printer, or anything special beyond basic computer, tape-drive and color TV. Joystick can be used. Can run from disk.

The Manual is easy-to-read and has complete step-by-step instructions designed to quickly teach the new user how to draw pictures. It has been tested with both teenagers and professional artists. The manual also contains picture load and display program.

**PAINTPIC** incorporates a start-up attractor picture of the Rose, which automatically cycles through the sixteen Commodore colors.

**MODES:** pen, brush, text.

**CURVED SHAPES:** arc, circle, ellipse.

**STRAIGHT SHAPES:** box, line, triangle, parallelogram.

**FILL:** pen, or brush

**SETTABLE COLOR:** pen, bristles, brushmoves, four dot-colors, crosshair, border, background.

**MOVES:** horizontal, vertical, diagonal, by dot, brush width, character.

**POINT MOVES:** to start, end, midpoint, next home, perspective.

**BLOCK MOVES:** copy, rotate 90°, halve or double across or down, mirror across and down

**SELECT FEATURES:** file save/get picture or block to tape/disk; mix shapes, text, all graphics characters; eight storable brushes; select brush width; tilted shapes; perspective point and line; mark start, end, perspective point; Help Menus.



**\$49.95** plus P & P

### The VIC Centre

416 Logan Road, Stones Corner,  
Brisbane, Australia.

P.O. Box 274 Sunnybank Qld 4109

Tele: (07) 397 0888

STD FREE: (008) 777 130

(A division of CW Electronics)



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## BOOK REVIEW - SPRITE GRAPHICS FOR THE COMMODORE 64

This is a real gem of a book. If sprites are a mystery to you then here is the answer to your problems.

Nicely presented, it covers defining, priorities, multi-colour sprites, movement and animation. It is written by Sally Greenwood Larsen.

Ms. Larsen is a teacher and her approach to this subject illustrates that she has the ability to pass on information in a precise, entertaining and efficient manner. The book has a library of sprite designs for the reader to base his/her own experiments on. It also includes some colour photographic illustrations of the same. Designed for the beginner and intermediate computer user, Sprite Graphics

for the Commodore 64 leads the computerist through the steps that will define sprites, colour them, animate and design collision priorities for games etc.

It is a very handy guide to nearly anything you want to know about sprites. This book is excellent value and is highly recommended.

Title: Sprite Graphics for the Commodore 64

Author: Sally Greenwood Larsen

Publisher: Micro Text / Prentice Hall Publications

Price: \$25.50

Sample from: Prentice Hall Australia Pty. Ltd.

7 Grosvenor Place, Brookvale NSW. 2100

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## TUMBLER FOR THE COMMODORE 64

```
100 REM****GAME GRAPHICS*****
110 K=7168:FORJ=32*8TO32*8+7:POKEK+J,0:NEXTJ
120 READCH:IFCH=100TO140
130 POKEK,CH:K=K+1:GOTO120
140 PRINTCHR$(147):X=64:POKE36869,255
150 PRINT:PRINTSPC(6)CHR$(18)CHR$(30)"GAME GRAPHICS"CHR$(145)CHR$(31)
160 POKE36878,15:S=36875:B=128:E=138:PRINTCHR$(31)
170 FORM=BTOESTEP5:POKE3,M:NEXTM:POKE3,0
180 PRINTTAB(80-X)CHR$(X)CHR$(32)CHR$(145)
190 FORM=BTOESTEP5:POKE3,M:NEXTM:POKE3,0
200 IFX=79THENPOKE36869,240:PRINTCHR$(147):END
210 FORT=1TO150:NEXTT
220 X=X+1:B=B+5:E=E+5:GOTO170
230 REM****CHARACTER SETS****
240 DATA24,24,127,24,56,40,40,40
250 DATA96,96,60,50,240,72,36,18
260 DATA96,98,60,16,114,78,66,192
270 DATA50,52,152,113,50,44,32,24
280 DATA0,4,104,113,62,48,73,134
290 DATA65,34,20,217,242,60,192,0
300 DATA65,34,148,89,50,252,192,0
310 DATA48,8,228,28,12,63,40,0
320 DATA64,32,24,248,28,42,34
330 DATA0,64,32,24,248,28,42,34
340 DATA1,2,4,254,30,40,72,132
350 DATA38,22,24,52,82,144,144
360 DATA12,76,56,14,8,24,36,34
370 DATA48,178,84,56,16,16,40,68
380 DATA177,178,84,56,16,16,40,68
390 DATA48,48,16,56,84,16,16,48,-1
```



## BOOKS - Continued from page 25

### **VIC GAMES** *Reviewed by Wayne Hodges*

This book defies its title, for it is not entirely games but includes a number of additional or 'BONUS' programs as the Author calls them. This is a little joke of his because if the BONUS programs were removed the book would be so thin it would not be a saleable proposition. But before we take this as too much of a criticism let's have a look at these 'BONUS' programs.

They include: a JOYSTICK TESTER ROUTINE that you can build into your games to utilise a joystick, HIRES AND LORES GRAPHICS, PROGRAMMABLE FUNCTION KEYS, SOUND EFFECTS even a TINYMON for assembly programming.

These programs are mixed in with some fairly sophisticated games, most you've seen in some form or other. There is RUBIC CUBE, a version of MASTERMIND, a few shoot-'em-ups, some excellent car races and some educational programs.

I feel that the games writer will find the best value in this book. Here you have in an easy to read and understandable form approximately 35 programmes that can be dissected and used as subroutines in your own games and programs.

The final program in the book is a TAPE DIRECTORY which allows you to gain quicker access to programs through the use of the fast forward button on the cassette. A useful book indeed and some good games.

TITLE: VIC GAMES  
AUTHOR: Nick Hampshire  
PUBLISHER: Hayden  
PRICE: \$20.95  
SAMPLE FROM: HOLT-SAUNDERS  
9 Waltham Street, Artarmon, NSW

### **VIC GRAPHICS:**

*Reviewed by Wayne Hodges*

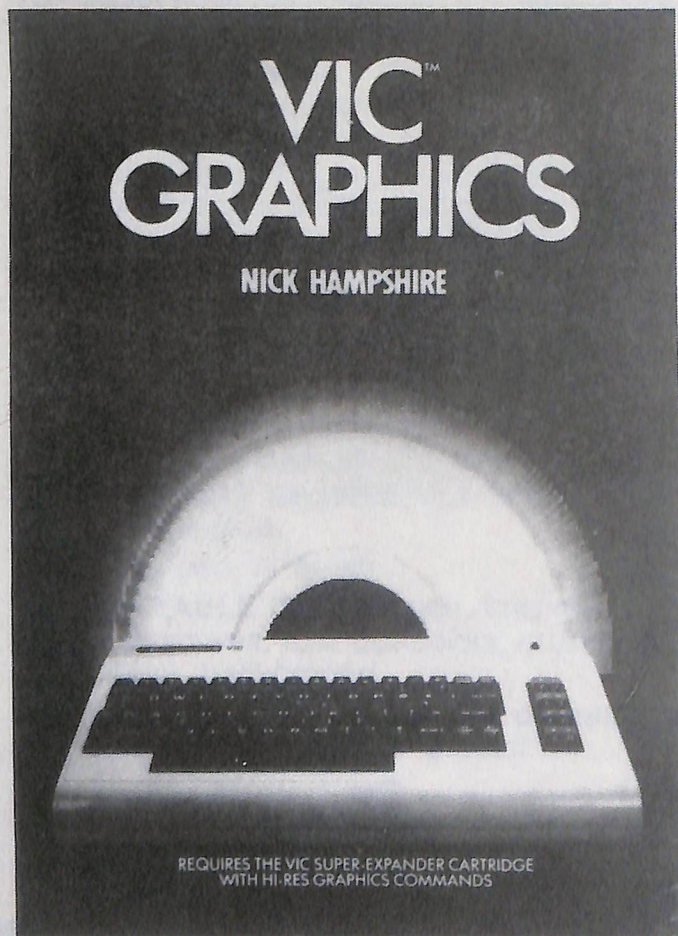
The provision of low cost high resolution graphics is probably one of the most exciting and challenging features of a popular home computer like the VIC. 'says the Overview at the beginning of this exciting addition to the already packed computer bookshelves. This is a most interesting manual that sets out to 'Stimulate your imagination' in presenting 'High resolution graphics' for the VIC computer. But does it live up to its glossy cover and well prepared presentation? Yes, but with some reservations.

#### **THE CONTENTS**

First, to use this book you require the VIC SUPER EXPANDER CARTRIDGE WITH HIRES GRAPHICS COMMANDS. Second, to write the section entitled 3D DISPLAYS you require an addition to your SUPER EXPANDER, something which is not highlighted in this book until you reach the last section. But apart from that we should find this little endeavour by Mr. Nick Hampshire quite rewarding.

#### **1. COLOUR CONTROL**

The first section looks at the colours which are available to your VIC computer with Super Expander, it also examines the theory of colour plotting through the modes. This explanation is highlighted by examples and clear diagrams. When we reach the programs they are well set out and easy to write up. They show the tremendous range the VIC has in it's arsenal. The programs here include: RANDOM COLOURS, A MAP OF THE USA (dazzling) and a RAINBOW (colourful to say the least). But my favourite is THE FAN which displays a pretty and changing colourful pattern using high resolution plotting.





## 2. HIGH RESOLUTION

A well set out section which examines the theory of HIRES PLOTTING. The graphic display modes of the VIC are dissected with simplicity, and with descriptions of all major functions. Sample programs are illustrated to make some points, with examples clearly set out also. It then sets out two programs for the plotting of a graph, also others in this section include plotting, points, lines and circles, and other assorted shapes are catered for too.

## 3. GRAPH PLOTTING

The plotting of a graph here is shown to produce good results, showing examples, and with a 3D program that may make up for the others that appear in the final section of this book that requires more memory.

## 4. SCALING, STRETCHING, ROTATING AND MOVING.

Covering two sections that lead the unsuspecting reader through a liberal serving of many interesting Graphic effects, which are both effective and satisfying.

## 5. 3D DISPLAYS

Unfortunately I cannot testify to the programs set out in this section because of the additional memory required. (8K extra as well as SUPER EXPANDER). My criticism has been stated earlier, so I will not dwell on this any further other than to say in defense of this omission, is that the program, if written should have spectacular results.

## SUMMARY

In this well set out publication the errors are far outweighed by a well set out and ideal book for those who require initialisation into the world of VIC computer graphics. I might just add that it is the only book on the market on this subject that I have seen at this stage.

Good points: The program formats leave out any room for error; The programs work; (other publications please note);

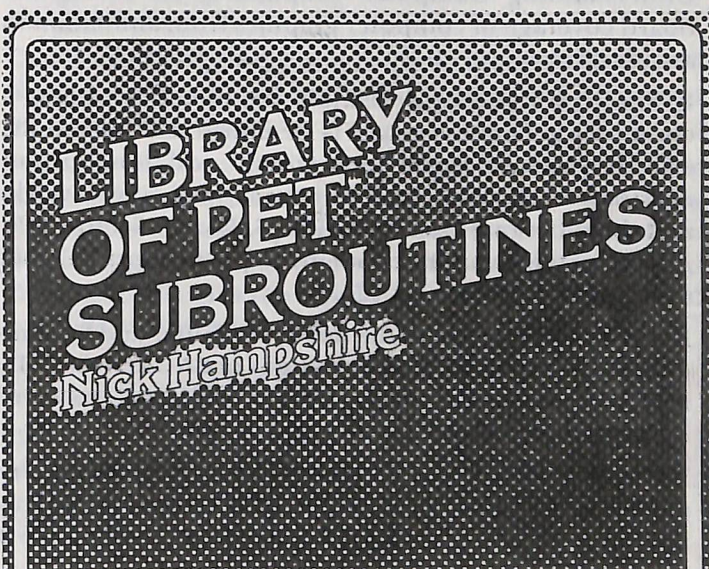
## FINAL WORDS

For those of you who have a VIC and would like to discover what else you can do with it, or learn a little more about VIC GRAPHICS then don't go any further than this one.

Title:	VIC Graphics
Author:	Nick Hampshire
Publisher:	Hayden
Price:	\$20.95
Sample from:	HOLT SAUNDERS 9 Waltham Street, Artarmon. NSW

## A LIBRARY OF PET SUBROUTINES

This book is without doubt one of the most useful programming books available to the PET owner. Written by Nick Hampshire (the old guru of PET), this book contains an amazing 53 subroutines.



The 53 subroutines cover a wide range including: drawing a border around the screen, bar graphs, data file display, sorting arrays and still more. All the programs are presented with an in depth description of exactly how they work, some problems that may arise when you put them into your own programs and areas of possible use for them. Most of the programs are written in PET BASIC but there are numerous machine language versions and subroutines for some applications.

Nick Hampshire also gives an insight on the logic framework needed to 'build' new programs. The book is designed to save time and in keeping up with, this all of the subroutines (which can be operated in their own right as well as in other programs) will soon be available on PET disk.

One of the finest books out for the PET programmer. There is one minor drawback however and that is its binding. With repeated use the book is likely to start to fall to pieces and must be handled with care.

Title:	A library of PET subroutines
Author:	Nick Hampshire
Publisher:	Hayden
Price:	\$26.50
Sample from:	HOLT SAUNDERS 9 Waltham Street, Artarmon NSW.



## UNDERSTANDING COMPUTER GRAPHICS

These Usborne Computer Books are almost addictive. They are inexpensive (\$6.50) and although aimed at the childrens' market are being used more and more by computer enthusiasts as quick reference sources.

Understanding Computer Graphics is an across the board coverage of computer graphics from animation to arcade games.

In the typical Usborne fashion, the methods of how a computer generates images is demonstrated by simple, effective and colourful (one should add humorous) illustrations. It demonstrates how a video screen works and the differences between HiRES, LowRES and TYPE graphics, the quantity of memory (in proportion) that each uses and what a PIXEL is.

It discusses graphics on the home computer and has one of the best and shortest explanations of BACKGROUND, MIDDLEGROUND and FOREGROUND screens there is. It covers printers, plotters, touch pads etc.

The basics of 3D, CAD and Computer simulations are explained and illustrated. Naturally with the space operas abounding it shows a bit of TV and film graphics and so it goes on.

For a small book it really crams the information in but it is mainly done with illustrations. There are some listings as well (eg. In-betweening, Pattern Generator).

For a quick introduction of the basics, these books are the "ant's pants".

Title: Understanding Computer Graphics  
Author: Judy Tatchell and Les Howarth  
Publisher: Usborne Computer Books  
Price: \$6.50  
Sample from: Ashton Scholastics

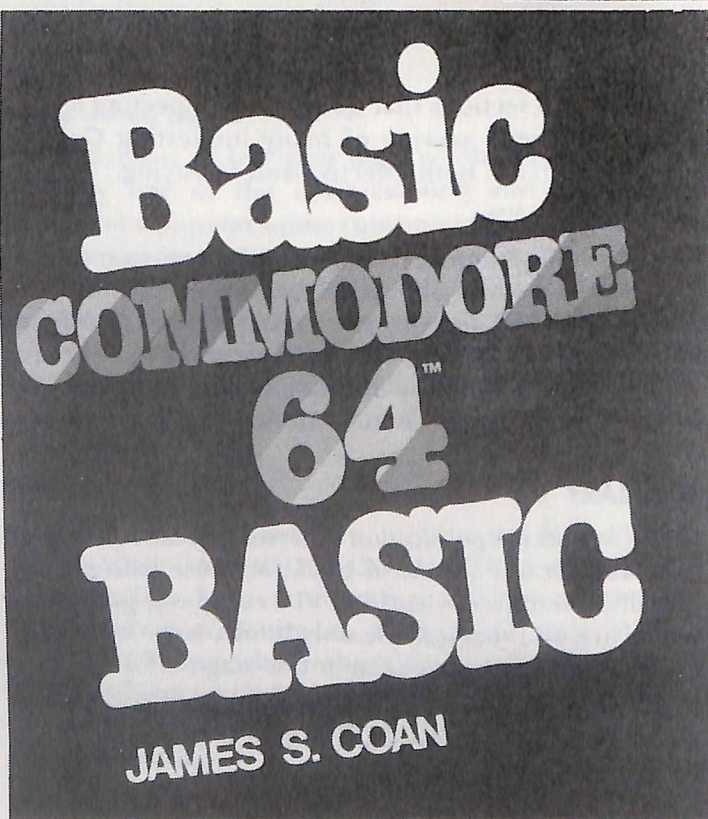
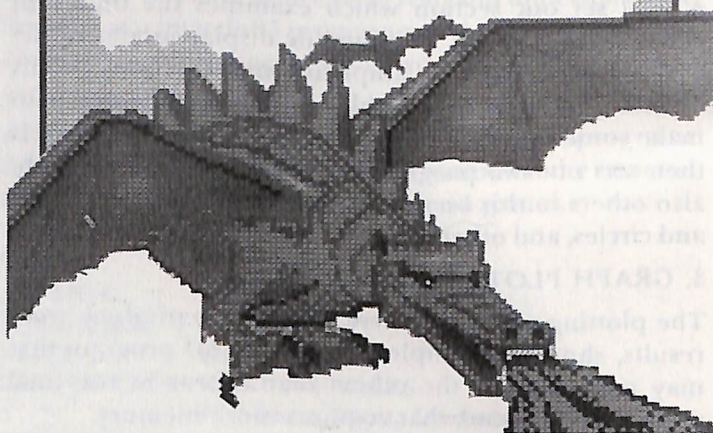
## BASIC COMMODORE 64 BASIC

We should have possibly kept this book for our educational supplement, for it is unashamably a text book on the Commodore 64. The book would seem to be aimed at the High School market and is very thorough in its approach. It covers most aspects of BASIC in a logical and clear order. Each section has problems to solve and there is a solution section at the back.

BASIC COMMODORE 64 BASIC is very comprehensive in its coverage with a large number of short listings (which demonstrate the various functions of BASIC) and a large number of summary sections. The type is easy to read. All in all it is a very nice book. The rather large section on graphics is well handled and possibly one of the better areas of the book.

# UNDERSTANDING COMPUTER GRAPHICS

From computer animation to arcade games



Good educational value. I think any teacher in this area should have a closer look at it. Although I would like to have seen a larger section on flow charts and program planning.

Title: BASIC COMMODORE 64 BASIC  
Author: James S. Coan  
Publisher: Hayden Book Company  
Price: \$23.95  
Sample from: Holt Saunders Pty. Ltd.  
9 Waltham Street, Artarmon. NSW. 2064.



# DATAFORM

A PROGRAM REVIEW

What was that you wanted, a new diskdrive, a printer? Well, if your game enough to try the horses (and I'm not) DATAFORM may help you along BUT!

The 'But' is that you will need to have a little more than basic knowledge of the track and where to get information. DATAFORM's objective is for the user to have an accurate set of prices on race day. It is based around the DON SCOTT value method or at least it seems that way. As a matter of fact DON SCOTT'S book 'THE WINNING WAY' and DATAFORM would make an excellent commercial package.

Before we go any further let me make one thing clear, DATAFORM will not predict the winning horse. DATAFORM is a tool to estimate price and rating of the horses in a race. You then compare these with the odds being offered by the Bookmakers to determine if the horse is good value to bet on.

The program will accept details of track, past performances, variations in class and race margins in each race.

You enter horse name, weight carried, limit weight, horses winning and losing margins, barrier position, jockey rating, distance, number of starts and number of

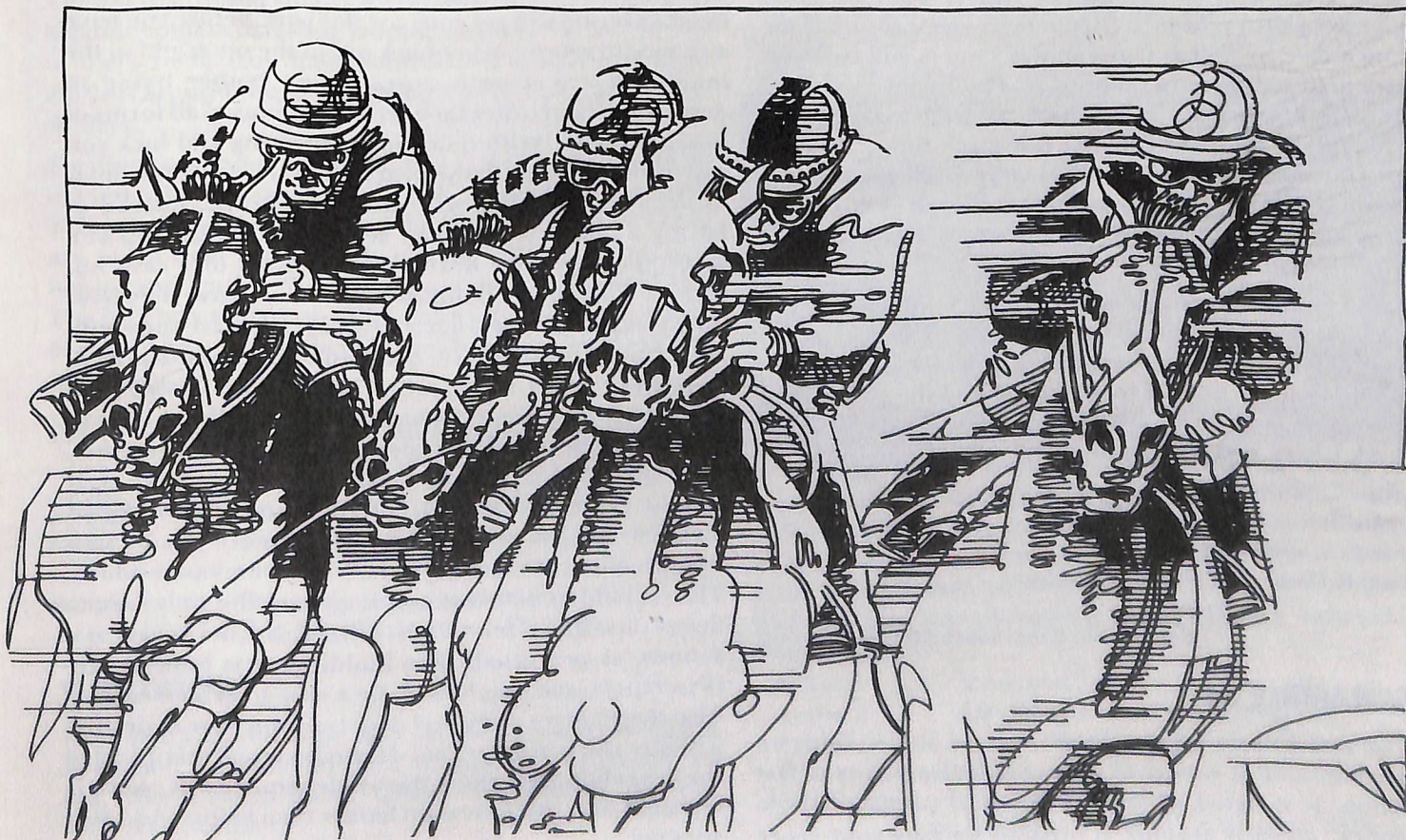
wins. With this mouthful the computer can find the rating of the horse after race day, that is the horse's PAST RATING.

To rate and price a field of runners before the race, you enter similar details to the above on each horse. The computer will then give the FUTURE RATING for a particular race.

Confused? Well, the system is a little more sophisticated than possibly required by the fifty cents a bet TAB punter on a Saturday afternoon.

I can see someone getting this program and subscribing to a mailing similar to Superform - Eagleform and using the service to build up basic file and then opening their own rating service for punters as a home business. But don't take this idea too lightly, succesful punting is hard work no matter what fairytales you hear.

Title:	DATAFORM
Sample from:	VIC Centre 416 Logan Rd., Stones Corner, Brisbane. Qld. Australia.
Cost:	\$59.95





# GAMIE REVIEWS

**In this issue of the Commodore Magazine we are concentrating on Graphics, in keeping with that policy, most of the games we have reviewed in this issue have been chosen for their graphical qualities. Others for their non-graphical qualities. All are currently on the market.**

## MOON BUGGY 64

This game, like most of the games we are currently receiving, has excellent graphics. The moon scenery is excellent as is the Moon Buggy itself and the various aliens that appear. Unfortunately there seems to be a slight bug in the program that can cause the player to become annoyed when it occurs. The bug seems to be that when the rocks are placed on the screen (we presume that this is a random process) can put the rock in such a position that it is seemingly impossible to destroy or avoid. (It could be that our reflexes are not as sharp as they need to be but...). In all other aspects of the game the quality of action is equal to the arcade version. The game involves travelling along the moon's surface protecting the moon from invasion. The buggy which you control via a joystick is an all-surface highly manoeuvrable defensive patrol vehicle. It encounters spaceships attacking from above, as well as tanks, mines, craters and rocks on the moon's surface in front of it. The buggy is able to jump any obstacles in its path as well as fire both horizontally and vertically (at the same time). As each level (or mission if you prefer) is completed you are sent out on another journey that is harder than the one before. A level consists of a journey over the moon's surface to the home base.

Based on the arcade game of the same name (minus the 64), this game from Anirog has much of the graphical qualities as the arcade version but lacks some of the 'sophistication' needed to make it one of the all time top ten games. It is however annoyingly addictive (so far I think I have racked up some 20 hours playing time).

Title:	Moon Buggy
Publisher:	Anirog Software
Price:	\$20.00
Sample from	Melbourne House, Suite 4, 75 Palmerston Cres. South Melbourne 3205

## SCRAMBLE 64

This is definitely a game to get excited about. Here we have not only a variety of screens but also plenty of fast action. It is based on one of the most popular arcade games currently around. It involves guiding your space

ship through a system of enemy fortifications and destroying their command module. To reach this though you have to pass through various defenses. The first one you encounter is landscape that is covered in various alien constructions, notably fuel depots. In order to survive you must keep your fuel level up and to do this you destroy the fuel depots. Dotting the landscape however are many missiles which you must avoid or destroy with your laser. If you don't you will lose a ship; you only have three ships (unless you manage to get to a score where a bonus ship is awarded). The next screen involves travelling through a giant underground cavern, there are no missiles this time but there are alien spaceships that clutter up the cave. Avoid, destroy or be destroyed are the courses of action you can take (remember to keep straffing all objects on the ground). Only rapid firing and quick manoeuvring will get you past this part. Before you have a chance to relax you are back out in the open and in the middle of a meteorite storm. Don't bother trying to destroy the meteorites they are impervious to all forms of bombardment. With quick manoeuvring and luck you will be on your way to the next screen. This one is similar to the first, differing only in the landscape, instead of having a planet surface you are located on the top of a skyscraper city. The next screen consists of a cave but instead of the normal things you find in a cave they have built a city in it. And what a city, not only have they built skyscrapers but they have also built buildings that hang from the roof of the cavern. this time no missiles, no aliens only fuel depots. Whats the catch? All you have to do is follow the corridor created by this weird construction. The only thing is, it has several 90 degree turns in it. It takes a great deal of concentration and highly skilled manoeuvring to get past this one. But once you are past this, it's after the main objective (the command module). This is hidden between buildings and the only way to destroy it is drop your bombs on it. This is not as easy as it sounds (as per usual). The buildings it is between are skyscrapers, and you have to be a very accurate bomber. Also there are no more fuel depots so you have to destroy it before you run out of fuel. Having done all this it's on to the next alien area where the whole sequence of events is repeated only this time even harder than before. And so it goes on.



This is definitely a must for any game enthusiast.

Title: Skramble  
Price: \$20.00  
Publisher: Melbourne House Software  
Sample from: Melbourne House,  
Suite 4,  
75 Palmerston Cres. South Melbourne 3205

## METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

The place is the edge of the galaxy at an outpost built after the Gridwars. The same technology that was developed to fight the aliens on the grid enabled mankind to expand his domain to the very edge of the galaxy but there they encountered the encountered the energy hungry aliens. The aliens began to attack the outposts with large mutant camels but mankind learnt to combat them and learnt how to mutate animals to wield the same deadly laser beams as the camels.

The most suited were the Llamas so all outposts soon had as defenders Metagalactic Llamas. This is where the game begins.

The aliens are attacking again but this time in the form of gigantic spiders that drop from webs from the sky (the top of the screen). You have control of a Llama and must guide it around the screen firing its laser and killing the spiders.

For the unexpanded VIC-20, this is another game from the Jeff Minter range and is up to his usual high standard. The pace is exhilarating and the graphics superb. There are more than thirty levels of play and each one gets harder and harder. You can even choose the initial level. The best way to describe this game is to say that it is fast, exciting and is very addictive. Another must for the games collection.

Title: Metagalactic Llamas Battle  
On The Edge Of Time  
Author: Jeff Minter  
Publisher: Llamasoft  
Price: \$19.95  
Sample from: Progressive Software Publishers  
P.O. Box 436, Pymble NSW 2073

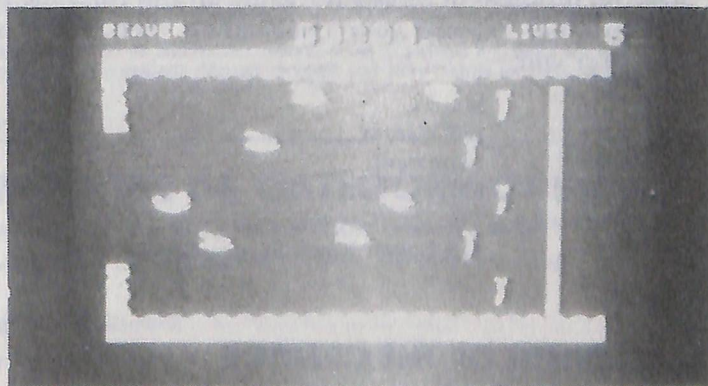
## EVOLUTION

How well can you cope with the evolutionary struggle? Evolution is a game for the Commodore 64 that will test out what Darwin called "Mans evolutionary superior survival instincts".

The game involves starting from the very beginning of the evolution chain and surviving as various creatures on your way to reaching a human. You start as a lowly one celled creature called an amoeba. You face all the hazards of the microscopic world (spores, microbes and antibodies) as you try to eat all the DNA to advance to the next level.

There are six distinctive stages of evolution in this game the first is the above mentioned Amoeba after that comes a tadpole avoiding fish and eating waterflies, a rodent eating cheese (and avoiding snakes), a beaver building a dam in an alligator infested river, a rare orange gorilla protecting your only food supply (three oranges) from monkeys and finally you will reach the human stage. The human stage involves ridding the world of genetic mutants in an elastic battle field with your laser gun (be careful they shoot back).

Finally watch what the human race evolves into. This game has up to 99 levels, optional control from either a joystick or the keyboard of the Commodore 64. The program is currently only available on diskette so a disk drive is necessary. The graphics are superb and the music is amusing (if you get tired of listening to it or the sound in general you can turn both or either off). The program keeps track of the top ten high scores and records them on the game disk. If you happen to get hungry during a game you may freeze the screen or simply wait for the intermission (could be helpful to have a copy of Darwin's theory of evolution on hand).



A welcome change from the shoot-em-down variety of games that the marketplace seems to be inundated with. A must for any game collection and entirely suitable for all ages (I warn you not to play with someone less than ten years younger than yourself its it can be embarrassing to find that you haven't evolved as high as they have yet.) Good luck!!

Title: Evolution  
Authors: Don Matrick and Jeff Sember  
Publisher: Sydney Development Corporation  
Price: \$39.95  
Sample from: Computer Classics,  
11-15 Falcon Street Crows Nest. NSW.



# GAME REVIEWS

## MATRIX

At last the sequel to Griddrunner. Matrix is a faster moving game for the Commodore 64. The visual graphics are stunning and the pace of the game never slackens (it keeps getting faster in fact).

From the creators of Griddrunner, the game continues where Griddrunner finished. The time is some twenty years after the Grid Wars have finished you are a retired Grid fighter pilot. The call goes out for people just like you. The reason? The aliens have returned and power is being drained from the grid once again. You are given a new improved grid fighter and are sent in to action once again.

This time instead of having just the "X-ZAPPER" and the other deadly aliens to combat, the aliens have a new weapon for you. It is the dreadful cameloids. These are robotic camels that come down the grid in search for you. They have a somewhat disturbing effect on one's mentality. Still you must battle on, after all the fate of the entire world's power supply is in your hands. If you fail....

This game is without doubt the most annoying game around and you will get totally involved in its incredible graphics. The game comes on cassette and it is neatly packaged in Llamasoft's quite distinctive little carry pack. The instructions are included with it so that when you load in into your C64 and connect the joystick you will have no problem in getting the game up and running. If Griddrunner capture your imagination then this is a game for you.

Title: Matrix  
Author: Jeff Minter  
Publisher: Llamasoft  
Price: \$21.95  
Sample from: The VIC Centre,  
416 Logan Road, Stones Corner. Qld.

## LABYRINTH OF THE CREATOR

This is the fourth in the Metamorphosis series and is also part two of the Earth Warrior (part one is called The Creator's Revenge). Unfortunately this game does not live up to the standard of the preceding games.

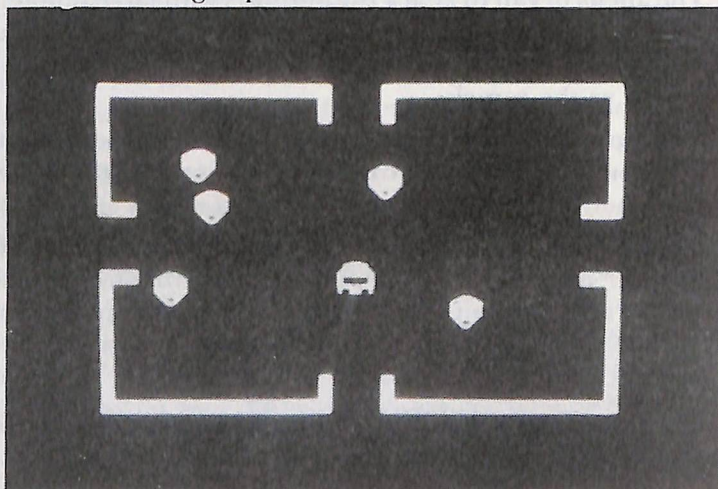
The graphics are great, the music is amusing but the mapping is extremely hard to follow. The scenario is that you have been given the task of destroying the Creator in his 256 room labyrinth. In attempting this you will encounter deadly robots, skulls, spiders, false creators, lakes, avalanches and a weird looking indestructible creature that follows you everywhere.

Alright so far? Good, now it starts to get interesting. In

order to reach the room that the creator is in you have to turn off the power which shields him, to turn off the power you need the key to the power room, to get the key to the power room you need the key to the room in which the power room key is and that key is somewhere in the labyrinth.

The playing of the game is interesting enough but one does get annoyed with creatures you cannot escape and getting lost all the time. The author/s did put a map in the instructions at the start of the game in the instructions but unless you have perfect recall (or attempted to make a map) there is no way that you can find out where you are in a game.

Still if you like a challenge this is a good game. The graphics and sound effects are up to the usual standard. But if you get confused with the street directory it could be a harrowing experience.



Title: Labyrinth of the Creator  
Publisher: Victory Software  
Price: \$19.95  
Sample from: Ozisoft  
50 Clarence Street, Sydney. NSW. 2001

## QUEST FOR TAREK

A text adventure for the Commodore 64 of the most unusual kind. QUEST FOR TAREK (Tarek) is the base program of the Kim Books Adventure Club and it is an open ended adventure.

Tarek is the base program supplied to members upon joining and additional modules are added to it through the regular club newsletter called PANDORA.

A commercial version of Tarek is available but this does not allow the additions of further modules.

The scenario is as follows:

'You are woken from Hyper Sleep on a massive man-



made planet. The planet is a genetic research and power station for a small cluster of planets. Your rebriefing module informs you that there has been a disaster on the planets and all communications have ceased. The power output of the station is gradually reducing and is currently at 25% of capacity. Unfortunately the re-briefing module ceases after telling you these facts. You are alone. Will you survive?

Players are required to load and run 'ADVENUTE' before loading Tarek. This is a mini utility program that adds some additional data handling commands to the Commodore 64.

So the adventure begins. This adventure is definitely in the Science Fiction Horror category. Your goal is to find Tarek and stop the power drain.

The action takes place in a man-made space station. A space station that would overwhelm N.A.S.A. The stations construction consists of rooms, communications shafts

and an awesome void. The mapping of the station is quite complex (to say the least). Based on a Dodecahedron, (twelve side solid), the rooms (over 456 and growing) are numbered by level, sector and room.

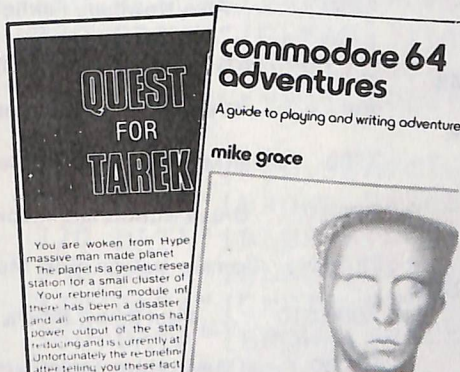
Movement is controlled by the use of a very shortened version of English. It allows you to use commands such as: go hatch; get screwdriver; eat food

Some of the verbs are listed on the cassette cover. Others you will discover as you journey through this world.

Generally, when you have entered an area there is a limited description supplied. However, (LOOK will get you an extended version).

Everything that happens in Tarek is dependant on past actions and events also your physical condition. Physical condition is of prime importance to your survival.

Physical condition is determined by many factors including how many injuries, food intake, medication, etc. This means that foraging for food is just as important as



## ADVENTURE CLUB

An expanding computer club for Adventure devotees and other interested people. Starting with the Commodore 64 the club will gradually incorporate other micros.

Membership of the club entitles a person to a regular newsletter, PANDORA, which will cover various aspects of programming and writing Adventures, scenarios, book and program reviews, etc. Also each member will receive a membership card, authoritative book on playing and writing Adventures and a base (or current state) club Adventure program on cassette (book and cassette to suit computer type).

The program will span wider as additional locations, perils, objectives and goals are added. Club members are encouraged to contribute program modules and story boards for these additions.

### AS A MEMBER YOU RECEIVE— (Conditions of membership)

**COMMODORE 64 ADVENTURES** — C64 members will receive this authoritative book on playing and writing Adventure games on the Commodore 64. It includes a complete Adventure, 'NIGHTMARE PLANET' to enter and play with notes and anecdotes on the problems and pitfalls of Adventure programming and how to overcome them.

**QUEST FOR TAREK** — The base program for the club — written in BASIC for ease of addition and amendment. After many years in hyper-sleep you wake upon a mighty artificial star, once a huge solar power station for a cluster of planets, but now an empty hollow ruin — can you survive?

**MEMBERSHIP CARD** — with your unique membership number. (not transferable)

**PANDORA** — A regular newsletter full of news, events programs and reviews etc.

### MEMBERSHIP CATEGORIES

**FULL MEMBERSHIP** ..... \$45.00\*

**ASSOCIATE MEMBER** ..... \$25.50\*

Card and Newsletter only

\* There will be an annual renewal fee equivalent to Associate Membership fee when renewal falls due.

ALL ITEMS & MEMBERSHIP CATEGORIES ARE SUBJECT TO WITHDRAWAL OR PRICE AND SPECIFICATION CHANGES WITHOUT NOTICE

## COMMODORE 64 CATEGORY OPEN

I wish to make an application to join the KIM BOOKS - Adventure Club

Please tick appropriate box and state what type of computer you have.

**FULL MEMBERSHIP** (Computer?) ..... ☐

**ASSOCIATE** (Computer?) ..... ☐

Signing of this form indicates agreement with conditions of membership listed above. Under 18 year olds please have guardian/parent's signature. Membership is not transferable.

Signature of applicant .....

I enclose cheque/money order for \$ .....

Please charge my BANKCARD/VISA/MASTERCARD \$ ..... No .....

NAME: ..... Signature: .....

ADDRESS ..... Expiry date: .....

..... P/code: .....

**KIM BOOKS** (a division of Mervyn Beamish Graphics Pty Ltd)  
82 Alexander Street, Crows Nest, NSW 2065



obtaining the end goal.

The adventure is presented in the classical full text way with no graphics other than the opening.

By now you may be wondering exactly what is TAREK, well:

'Think of HAL in 2001, ORAC in Blakes seven or R2D2 in Star Wars. Tarek is a combination of all of these and many more of the greatest traditional robots and computers. Tarek is a floating droid about the size of a soccer ball. But most importantly, Tarek is what the club members make him.'

It will be interesting to see how Tarek develops. Each club member is encouraged to contribute storyline ideas and modules for the further development of the adventure. Overall Tarek is excellent value for money and offers hours of amusement (and frustration) for persons of any age.

Title: QUEST FOR TAREK  
Authors: Mervyn Beamish, Wayne Mercer.  
Price: Commercial \$19.95  
Club Membership \$35.00 (Includes Book, Newsletter and Tarek.  
Publishers: Kim Books Adventure Club  
Sample from: 82 Alexander Street, Crows Nest. NSW.

## **GALAXY** *Reviewed by P. Canfield*

Galaxy is the newest game from Anirog. It is also one of the most exciting.

You are a spacefighter, fighting against formations of deadly enemy space ships. They appear at first as fighters followed, by a group of mother ships and flagships. They take up their positions in the formation and the assault begins. Scores of fighters speed down the screen firing lasers at you.

You retaliate with your lasers and destroy them (you hope) though sometimes they manage to escape you and go past you out of view at the bottom of the screen, don't relax though as they may circle around and hit your ship from behind.

To add to the excitement occasionally a mother ship will attempt to capture you with a tractor beam. If it succeeds your ship is drawn up the beam and you become attached to the ship. If you have any ships left, then one of those ships takes over the job of defence. If you hit the mothership that captured your previous ship, the captured ship is liberated and joins you, giving you double the fire power, (also giving the enemy double the target space).

Each time you clear one formation, another formation takes over, each successive formation becoming harder to destroy. Just to help your score along (this is displayed for

# HI - SCORES

VIC AVENGER	13,000 .....	Andrew Patford, Corio, VIC
RADAR RAT RACE	122,720 .....	Phillipe Koschitzke, Warracknabeal, VIC.
MOLE ATTACK	343 .....	Phillip Salive, Massachusetts, U.S.A.
OMEGA	3 Ships: 326,300 .....	Barry Atchinson, Commodore, Toronto
	5 Ships: 260,050...	Ben Piper, Chico, CA
GORF	99,999 .....	Maree Mullin, Aust.
GALAXIAN	26,000 .....	H. De Bruin, Aust.
ALIEN BLITZ	24,360 .....	David Hunt, Ingle Farm, SA
PINBALL	1,500,000 .....	Joe Ferrari, Commodore, Toronto
SUPER SLITHER	170 .....	Shaun Kenny, Padstow, NSW
BLUE MEANIES	1,260 .....	Alan Newman, Fairfield, CT
VIC FROGGER	217,010 .....	D. G. Fry, Duffy, ACT
6 LANE DODGEMS	404 .....	Brian Sutton, Stanhope, VIC
GROUND ATTACK	2,760 ...	Jason Mathewson, Colinsville, QLD
SQUASH	7,352 .....	Bruce Sutton, Stanhope, VIC
LAZARIAN	26,680 ....	Damien Nelson, East Malvern
COSMIC CRUNCHER	1,085,610 .....	Paul Zsiby, Bibela, QLD
MONEY WARS	70,090 .....	David Hunt, Ingle Farm, SA
GALACTIC CROSSFIRE	15,920 ...	Mark Freemantle, Narellan, NSW
UMI	142,757 ...	Mark Freemantle, Narellan, NSW
STORM	3,620 .....	Darren Mathewson, Colinsville, QLD
RAID ON FORT KNOX	8,600 ...	Joseph Tilley, Coomandook, SA
CLOWNS	327,550 .....	David Hunt, Ingle Farm, SA
MENAGERIE	2,200 .....	David Hunt, Ingle Farm, SA
STAR BATTLE	28,400 .....	Colin Mullin, Aust.
CASINO BLACKJACK	10,681 .....	Darrel Wadsworth, Elizabeth Vale, SA
TRASHMAN	188,880 .....	Carol Watts, Perth, WA

you), every two stages there is a challenge stage which can boost the score substantially.

My highest score is 48910. Lets see if you can beat that.

Price: \$20.00  
Sample from: Publisher: Melbourne House,  
Suite 4, 75 Palmerston Cres. South Melbourne 3205



---

# DOWNSCROLL

PAUL BLAIR

Much of the fun of computing is coming across the unexpected. This happened to me the other night (well, morning actually) So here it is for what it's worth.

The Commodore 64 has a neat routine built in that will scroll the screen up (it uses this every time you type in a new line or print to the bottom of the screen). This routine has a mate that does the opposite - downward scrolling. Try this little trick:-

---

```
100 REM DOWNSCROLL OF SCREEN
110 REM PAUL BLAIR FEB 84
120 REM COMMODORE 64
130 :
140 REM SELECT WHERE TO START SCROLL WITH 'D'
150 REM D=255 STARTS FROM TOP OF SCREEN
160 REM D=0 STARTS FROM SECOND LINE
170 :
200 D=0:X=214:V=15:A=53280:POKEA,1:POKEA+1,3:PRINT "[CLEAR]";
210 READA$:V=V-1:POKEA,V:IFA$="END"THENEND
220 PRINT"[CLEAR]";:FORT=1TO10:PRINTA$:NEXT
230 FORT=0TO14:POKEX,D:SYS59749:NEXT:PRINT
240 FORDELAY=1TO2000:NEXT:D=D+1:GOTO210
250 :
300 DATA"[RED,SPACE]SCROLL THE SCREEN DOWN WITH THIS PGM"
310 DATA"[BROWN,SPACE]IT'S REALLY VERY VERY EASY TO USE"
320 DATA"[BLUE,SPACE]YOU CAN INCLUDE IT IN GAMES AND SO ON"
330 DATA"[BLACK,SPACE]LIST THE PROGRAM TO SEE THE SET UP"
340 DATA"[GREY1,SPACE]SEE HOW YOU CAN SELECT SCROLL START?"
350 DATA"[BROWN,SPACE]HAVE FUN .....PAUL BLAIR"
360 DATA"END"
```

---

The items in [ ] are to help show the Commodore graphic symbols used.

The routine has an interesting side effect that I haven't quite worked out yet. Somewhere along the way some pointers get modified, and a LIST straight after running the routine can give some odd things. The solution seems to be to do a PRINT or two straight after, and things work themselves out.

There are probably people out there who could do all sorts of things with this sort of routine. How about it? Bring something along to a User Group meeting and show us all.

By the way, the first 3 lines are what I like to see in programs, as a bare minimum. I often forget what programs do, and the header lines help me (and others, too). ■



# POWERPAD — A TOUCHING EXPERIENCE

New product preview by Alistair Campion

For the first-time computer user, the keyboard is a clumsy input device. There is little logic in the distribution of keys, and as if to add pain to injury, the placement of control and function keys are at best confusing.

To many users, this lack of clear guidance is only a minor obstacle. Part of the aura of confidence surrounding many users is their ability to move at will between different computers, operating systems, programming dialects with a minimum of discomfort. To this minority, ergonomics, human engineering, or intelligible manuals are clearly unnecessary. Rather, the attitude is that the soft approach adopted by many manufacturers toward implementing more personal systems has created a barrier between the spirit of the machine and the end user.

Fortunately, we are now observing a turnabout. The last 12 months bears witness to the growth in the use of "mouse" technology, "windows", Personal CP/M, icons, and touch tablets. Each of these technologies represents a step closer to what can be perceived as the personal computer.

A chance to preview an exciting new product from Chalkboard in the United States was an opportunity to experience a device which narrows the gap between computing as a minority hobby to a level where computing can be said to be a "personal" experience. PowerPad is a touch sensitive tablet in a 510mm by 432mm hard plastic case. The device is of rugged construction, has a molded handle to one side, and is packaged together with a standard connecting cable and plastic stylus.

The elegance of PowerPad is that it can be used to replace the keyboard as a primary means of inputting information. We can now confidently state that such people as the old, very young, or the disabled who may previously have been denied access to a computer now have an inexpensive medium with which to convey information to a computer.

PowerPad has been designed so that mylar overlays can be clipped on top of the 305mm x 305mm touch-sensitive pad. Each overlay is a new keyboard, a keyboard with colourful shapes and figures. A feature is that there are only a few "keys" on each overlay, effectively the child or the beginning user isn't overwhelmed by choices.

Each of the "keys" are large and in bright primary colours. Printed on them are bold words (RED or PLAY) and symbols such as # or \*. Each of the keys are separated by plenty of space to make typing simple.

The most distinguishing feature of the technology associated with the PowerPad is its ability to respond to more than one contact point at a time. This has been accomplished through the use of a new form of membrane-switch based on discrete point referencing. The electronics

associated with PowerPad scan the entire surface about 20 times per second in search of points where the pressure is being applied. There are 100 switches to each 6 sq cm, a total of some 14,400 switches across the entire area of the PowerPad. In essence, the device can respond to any area or areas touched.

This capability is well demonstrated with PowerPad's music software and overlay, MicroMaestro. The overlay has a piano keyboard at the bottom and a musical score in the middle, with colourful 'buttons' for each note on the score. By pressing one's fingers on different keys at the same time musical chords were generated. This feature would be impossible on any other touch pad.

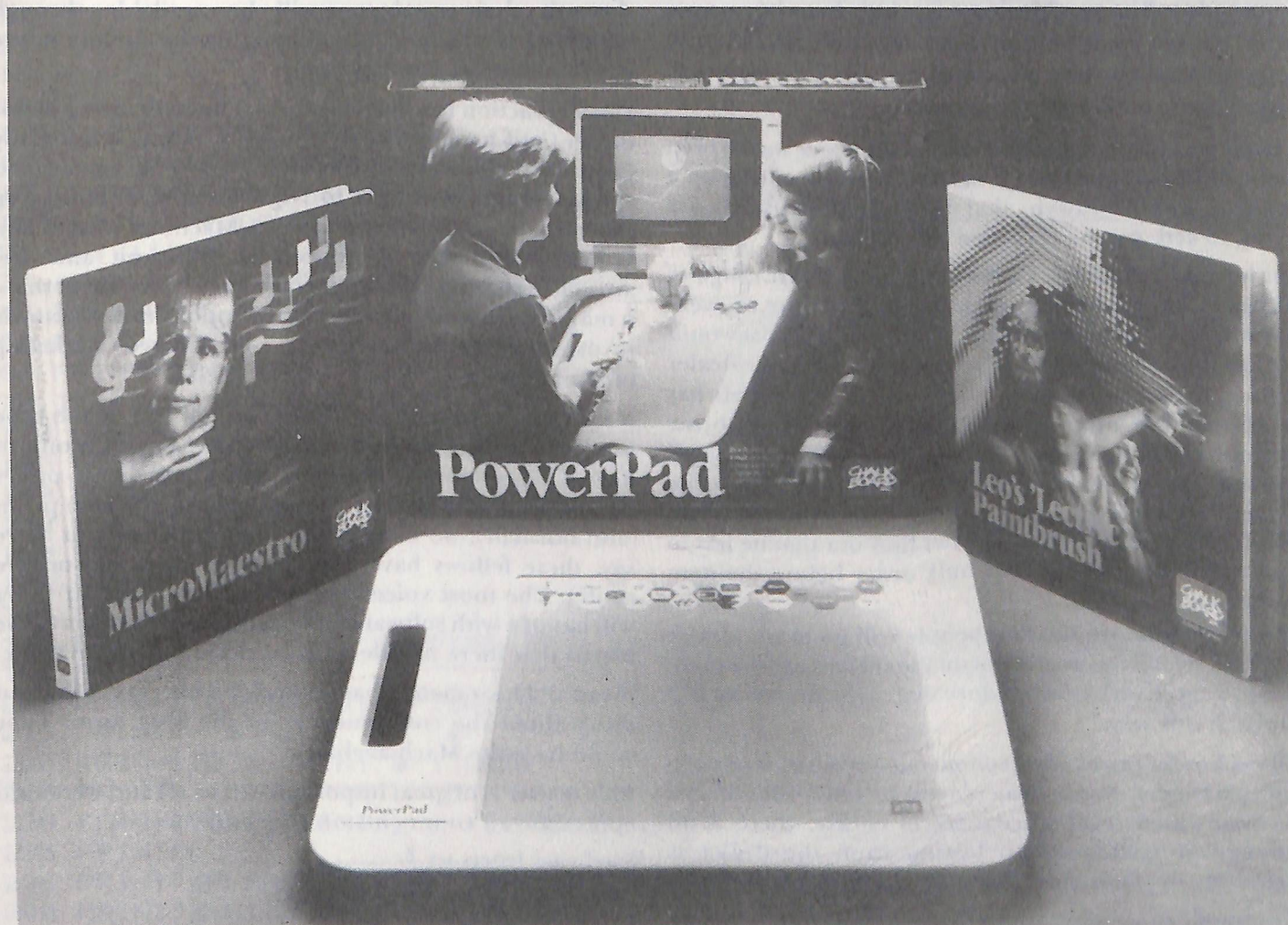
Another software-and-overlay package, Leo's 'Lectric Paintbrush, helps a child create colourful pictures on the computer. Again the multicontact feature of the PowerPad becomes especially useful. Before drawing each new part of the picture, the child can press the Pen Up button on the upper left-hand corner of the board. When the child picks a new colour, the colour of the pen tip changes to that colour.

## LEONARDO'S LIBRARY

The PowerPad retails for \$199.00. It is supported by a large and growing body of educational software called Leonardo's Library. Programs in the library cost between \$40-\$80. Included in the library are programs that focus on the visual arts, music, maths, language arts, and social studies. Commodore users will be able to select from among the following first releases:

- ★ **Leo's 'Lectric Graphics.** A high resolution graphics package for the beginner or professional. Built in structures for the creation of basic shapes, object movement, repetition and rotation. Four way mirroring, magnification of entire pictures or single objects. Ability to save to either disk or tape. (CBM 64 cartridge)
- ★ **Leo's 'Lectric Paintbrush.** An electronic finger-painting kit. (CBM 64 cartridge)
- ★ **MicroMaestro.** Turns the PowerPad into a piano keyboard. (CBM 64 cartridge)
- ★ **PowerPad Programming Kit.** Designed for older children and adults to write their own software and develop their own creative uses for the PowerPad. (CBM 64 disk)
- ★ **BearJam.** An educational game designed as a pre-reading skills activity. (CBM 64 cartridge)





The "PowerPad" (centre) and three software packages from "Leonardo's Library". The PowerPad is a touch-sensitive input device, which is an alternative to the computer keyboard; the learning/entertainment software provides children and adults with open-ended, self-paced learning in six subject areas.

- ★ **LogicMaster.** A problem-solving game. Secret codes must be solved by formulating and testing hypotheses. (CBM 64 cartridge)
- ★ **Leo's Links.** A golf game for one or more players. Players must design their own course, then using woods, iron and putters, play each of the greens. Educationally sound in that the players must determine angles, distance and elevation. (CBM 64 cartridge)

#### SYSTEM FOR FUN-LEARNING

As a home entertainment system, PowerPad is robust- the youngest member of the family can use PowerPad without fear of damage- it is inexpensive, and it offers a wealth of applications. These range from highly ver-

versatile graphics software to Boolean Blueprints, a simulation of the internal working of a computer.

With its emphasis on discovery-learning, PowerPad is sure to find its way into the family living room as well as the school classroom. Already close to completion is Borderlines, a simulation of the decision-making process in international relations; Runway, a flight landing simulation; and Leonardo's Logo an application of the Logo programming language.

The PowerPad and Leonardo's Library is distributed exclusively in Australia by Ashton Scholastic, P.O. Box 579, Gosford, NSW 2250.

Telephone: (043) 28 3555.

Telex: AA24881

Scheduled for release in early June from major retailer and micro computer stores. ■



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# MAIL-ORDER FROM COMMODORE

MERV BEAMISH

A company called Commodore Information Centre Pty. Ltd. who we're told is a different company from Commodore Business Machines Pty. Ltd. (but who operate out of the same address) has been set up to offer the full range of Commodore Software through a seventy-two page, colour mail-order catalogue.

A letter sent to all dealers stated that the move was to help them, although one finds it hard to see how setting up a company to sell Software, that the dealers themselves are trying to sell, can be classified as assistance.

But let's face the facts. Commodore has a vast range of Software. For an individual dealer to have one of every Commodore Software item on his shelves, the cost would be, I'm told, over \$10,000. There is no way that the dealer is going to be asked to stock every item on that list. He has to choose the most saleable items and stock those. Commodore tell us that only 5% of their Software range is stocked out in the market place. You can't blame the dealer, but it is frustrating for a buyer to wait around till the item is ordered - then to even find out that he has to wait until the dealer's next bulk order before the item comes in.

Well, Commodore say that people will go to the dealer first and then if the item is not on the shelves use the mail-order. I agree with Commodore that some dealers would prefer it this way.

All mail-order prices are recommended retail plus postage and packaging. Many dealers tend to sell a little below recommended retail price (and, of course, there is no postage or packaging) so buying from the dealer is definitely the cheaper alternative.

Commodore (...information Centre Pty. Ltd.) informed us that they intended approaching software importers

and local authors to enhance their already impressive list of software. They also point out that every item available through their catalogue will be available through Commodore dealers, this will enable the dealers to use the catalogue as a selling tool.

Dealer reaction has been two-fold. The Irish in one major dealer (and he legitimately spoke for many) immediately came to the surface in the form of several heated and sporadic telex messages to Nigel Shepherd (Managing Director, Commodore Business Machines Pty. Ltd.). Others have taken a 'concerned, but wait and see' attitude. One good thing that may have come out of this - it may force independent Software importers and authors to organise themselves into a co-ordinated marketing organisation.

Nearly any Commodore dealer can tell you of the time that they brought stock at current wholesale prices only to have Commodore (...Business Machines) drop prices dramatically with the nett result being small or no profit (and normally, no matter what the 'whingers' out there say, these fellows have still got to make a reasonable profit). The most voiced concern is that a similar thing will happen with software and lower profit margins to the extent that there is little use in stocking software at all.

'Beauty!' I hear many a hacker and end user cry in joy, but think about the consequences in the long term. They could be quite Machiavelian.

This matter is of great importance to us all and we would appreciate all comments on this subject.

Send your letters to:

The Editor, Commodore Magazine,  
C/O Mervyn Beamish Graphics,  
82 Alexander St. Crows Nest. NSW. 2065.

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## CASSETTE DIRECTORY: CBM/VIC

In the days prior to the Commodore Magazine Stephen Lee published this cassette directory for the CBM 4008.

We have reprinted it here with amendments so that it will run on the VIC and C64. As the program is designed for 40 character width VIC users will need to redesign their screen.

```
0 RUN 1
1 POKE59468,12
2 GOTO3
3 DIMFL$(14)
10 PRINTPEEK(249)
11 FL$(1)="<  CONCORDE LANDER  "
12 FL$(2)="<  NINE FIELD      "
```



# C64 modifications

```

70 IF (PEEK(1) AND 16) = 0 GOTO70
500 IF (PEEK(1) AND 16)= 0 GOTO500
530 POKE192,(PEEK(1) OR 32): POKE1,(PEEK(1) OR 32)
550 IF (PEEK(1) AND 16) = 0 GOTO550

```

```

13 FL$(3)="< █ BACKGAMMON █"
14 FL$(4)="< █ SUPER 9X9 █"
15 FL$(5)="< █ DIVE BOMBER █"
16 FL$(6)=" "
17 FL$(7)="THIS TAPE (C30) IS
18 FL$(8)="ONLY LONG ENOUGH FOR
19 FL$(9)="THESE FIVE PROGRAMS.
20 FL$(10)="FOR BEST RESULTS
21 FL$(11)=" USE (C60) OR (C90)
22 FL$(12)="TAPES.HAPPY PROGRAMMING.
40 PC=5.073E-2:REM
50 FFT=98:REM
60 PRINT"██████████PRESS STOP ON TAPE #1"
70 IF PEEK(249)<>0GOTO70
110 GOSUB170
130 GOSUB190
140 GOSUB430
150 GOSUB480
160 END
170 REM CLEAR SCREEN
180 PRINT"█";:RETURN
190 PRINT" ** DIRECTORY **"
191 PRINT" "
200 FORQ=1TO38:PRINT"█";:NEXT
210 PRINT" █ FILE █ DESCRIPTION █"
220 FORQ=1TO38:PRINT"█";:NEXT
226 PRINT" | "
230 FORQ=1TO12:PRINT"L ";CHR$(Q+64);" | ";FL$(Q):NEXT
235 PRINT"L | "
236 PRINT"PLEASE REWIND TAPE BEFORE PRESSING THE REQUIRED FILE LETTER !"
240 PRINT"WHICH FILE DO YOU WANT ?"
400 GETC$:IFC$=""THEN400
420 BS=ASC(C$)-64:F1=BS:RETURN
430 REM
440 BS=BS*8000
450 FT=.11594E1+.13985E-2*BS-.61234E-8*BS↑2+.24540E-13*BS↑3-2.5562
460 FT=FT*FFT/98*19.7134*PC
470 RETURN
480 REM
490 PRINT"██████████SEARCHING FOR FIELD ";C$
492 PRINT"██████████NAMED",FL$(F1)
496 PRINT"██████████PRESS FAST FORWARD ON TAPE #1"
500 IFPEEK(59411)<>53GOTO500
510 FT=TI+FT*60
520 IFTI<FTGOTO520
530 POKE249,52:POKE59411,61
540 PRINT"██████████PRESS STOP ON TAPE #1"
550 IFPEEK(249)<>0GOTO550
560 PRINT"██████████TAPE IS NOW IN CORRECT POSITION██████████"
570 PRINT"PLEASE WAIT..... ████"
590 PRINT"██████████PRESS █ SHIFT-RUN/STOP █ TO LOAD"
600 NEW

```

## VIC modifications

```

70 IF PEEK(192)<>0GOTO70
500 IFPEEK(37137)>65GOTO500
530 POKE192,52:POKE37148,241
550 IFPEEK(192)<>0GOTO550
555 POKE37148,14

```



# FLAGS for the Commodore 64

PETER CANFIELD

## SOME FUN WITH NATIONAL FLAGS

```
10 PRINT" "
20 POKE 53280,1 : POKE 53281,1
30 FOR A = 1 TO 7
40 PRINT" "
50 NEXT A
100 FOR B = 1 TO 7
110 PRINT" "
120 NEXT B
160 FOR C = 1 TO 7
170 PRINT" "
180 NEXT C
225 PRINT"
230 PRINT" WEST GERMANY "
```

|||||



## HELPFUL HINTS

MERV BEAMISH

Sorry! Sorry! I gave you the wrong tip last issue regarding free memory:

```
FRE (0) + 2*16
```

... will only work up to a point, replace it with:

```
FRE (0) - (FRE (0)*65536
```

### POKEING AND PEEKING

Pokes and Peeks hassle many people. Frankly the only way to beat the hassle is to poke. Variables take up valuable memory space when there is memory space to spare outside the BASIC area (especially with the C64). Why not allocate a memory location (outside of BASIC) as a variable, i.e. V = 50000

Now without the need for DIM statements or other variables (as long as the variable is below 255 and positive and whole numbers), you can have as many memory variables as the location can hold i.e.

POKE V, variable 1 or POKE V, variable 1

POKE V-1, variable 2 or POKE V+1, variable 2

POKE V-2, variable 3 or POKE V+2, variable 3

POKE V-3, variable 4 or POKE V+3 variable 3

POKE V-(n), variable (n) or POKE V+(n), variable (n)

OK, you have put in the value of the variable. To get it out you just PEEK thus:

PEEK (v) or POKE (v)

PEEK (v-1) or PEEK (v+1)

PEEK (v-2) or PEEK (v+2)

PEEK (v-3) or PEEK (v+3)

PEEK (v-n) or PEEK (v+n)

Another advantage of this is that as variables are stored outside the area used by BASIC when you type NEW and load another BASIC program the variables are still there. This enables you to use the same variables in a number of BASIC programs. You can amend the variables within a program i.e.

```
10 V=50000:POKE(V+3),64:PRINTPEEK(V+3)
20 INPUT"CHANGE Y/N":A$
30 IFA$="Y"THEN POKE(V+3),PEEK(V+3)+1
40 PRINTPEEK(V+3)
45 PRINTCHR$(PEEK(V+3))
50 GOTO20
```

From this you can see that you could have a lot of fun with PEEKs and POKEs. Why not try playing around with the ASCII values of their letters i.e. add to program. Keep between values of 64 to 90 for the time being. For testing use location 50000 for C64, 900 for PET and VIC-20 (tape buffer for PET and VIC). ■



```

10 PRINT"□"
20 POKE 53280,0 : POKE 53281,0
30 PRINT"██  ██  "
40 PRINT"██  ██  "
50 PRINT"██  █  ██  "
60 PRINT"██  █  ██  "
70 PRINT"██  ██  "
80 PRINT"██  ██  "
90 PRINT"██  █  ██  "
100 PRINT"██  █  ██  "
110 PRINT"██  ██  "
120 PRINT"██  ██  "
125 FOR A = 1 TO 2
130 PRINT"██  "
140 PRINT"██  "
150 PRINT"██  "
160 PRINT"██  "
170 NEXT A
220 PRINT"□":PRINT"    GREECE"
230 PRINT""
240 PRINT""

```

|||||

```

10 PRINT"□"
20 POKE 53280,0 : POKE 53281,0
30 FOR A = 1 TO 7
40 PRINT"██  "
50 NEXT A
100 FOR B = 1 TO 7
110 PRINT"██  "
120 NEXT B
170 FOR C = 1 TO 7
180 PRINT"██  "
190 NEXT C
200 PRINT
230 PRINT"    AUSTRIA"

```

|||||

```

10 PRINT"□"
20 POKE 53280,1 : POKE 53281,1
30 FOR A = 1 TO 20
40 PRINT"██  ██  "
50 NEXT A
250 PRINT"    BELGIUM"

```

|||||



```

10 PRINT"3"
20 POKE 53280,0:POKE 53281,0
30 FOR A = 1 TO 6
40 PRINT"23"
50 NEXT A
100 FOR B = 1 TO 6
110 PRINT"22"
120 NEXT
160 FOR C = 1 TO 6
170 PRINT"113"
180 NEXT C
200 PRINT
220 PRINT"          3BOLIVIA"

```

"

"

"

"

|||||

```

10 PRINT"3"
20 POKE 53280,0 : POKE 53281,0
30 FOR A = 1 TO 8
40 PRINT"22"
50 NEXT A
110 FOR B = 1 TO 4
120 PRINT"22"
130 NEXT B
140 FOR A = 1 TO 8
150 PRINT"22"
160 NEXT A:PRINT
230 PRINT"          3DENMARK"

```

"

"

"

**THIS PRINTOUT SECTION IS REPRINTED AS PART OF AN ARTICLE FROM VOLUME 3 ISSUE 6 STOCKMARKET SIMULATIONS IN WHICH THIS PART OF THE PRINTOUT WAS OMMITED.**

```

790 PRINT"[DOWN2]WOULD YOU LIKE TO MAKE ANY CHANGES (Y/N)"
:R$="":INPUT R$
795 IF LEFT$(R$,1)="N"THEN 704
797 IF LEFT$(R$,1)<>"Y"THEN PRINT"[UP5]";:GOTO 790
800 REM ***BROKER'S WINDOW***
803 POKE BC,1:PRINT CHR$(144)
805 PRINT"[CLEAR,RVS,SPACE11]BROKER'S OFFICE [RVOFF]";
807 FOR X=1 TO 40:PRINT"[RVS]*[RVOFF]";:NEXT
810 PRINT:PRINT"[DOWN3,SPACE3,RVS]STOCK[RVOFF]","",
[RVS]SHARES[RVOFF]",
"[RVS]PRICE[RVOFF,DOWN2]"
820 FOR X=1 TO 5
830 PRINT"[RVS]"X"[RVOFF]"N$(X),N(X),ST(X)
840 NEXT
850 PRINT"[DOWN2]YOU HAVE $"CS" ON HAND"
860 PRINT"[DOWN]WHICH STOCK (1-5) DO YOU WANT":PRINT
"TO CHANGE (0 TO EXIT)"
:INPUT A$
870 A=VAL(A$):IF A<0 OR A>5 THEN PRINT"[UP4]";:GOTO 860
880 IF A=0 THEN 704
890 PRINT"[UP3]YOU HAVE ENOUGH MONEY TO BUY "
892 N$=STR$(INT(CS/ST(A)))
895 PRINT"          "N$" SHARES          "
900 REM ***BUYING AND SELLING***
910 PRINT"ENTER NUMBER OR SHARES THAT YOU WISH TO BUY
(+)/SELL(-)":INPUT B$
920 B=VAL(B$):IF B>INT(CS/ST(A))OR B<(-N(A))THEN PRINT
"[UP3]";:GOTO 910
930 IF B<0 THEN P(A)=P(A)+(P(A)/N(A))*B
940 IF B>0 THEN P(A)=P(A)+ST(A)*B
950 N(A)=N(A)+B:CS=CS-ST(A)*B:CS=INT(CS*100)/100
960 GOTO 805      END

```

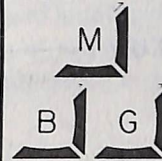




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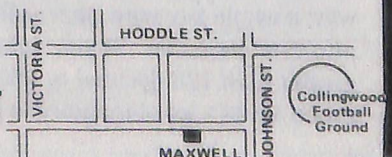
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# SUPERKEY-64

DARREN SPRUYT

from Transactor July 83

This is an adaption of a keyword utility, by Charles Brannon, for the Commodore-64. Burst keys are a handy thing to have around, as it shortens the time needed to enter keywords such as LIST, RESTORE, GOSUB and RETURN. Other keyword programs allow only 26 keywords to be included in their table, while mine allows up to 52 and 2 specials.

This keyword program works off of the hardware interrupt vector located at \$0314-\$0315 (the \$ denotes hexadecimal notation, in decimal the values are 788-789). The program re-routes this vector to go to the machine language routine located at \$c000 - \$c190.

At \$c000 the routine checks to see if the Function 1 key has been pressed, if it has, it goes into waiting mode. The program will stay in waiting until another key has been pressed. The legitimate keys to press are A through Z and shifted A through shifted Z. If any other key has been pressed, the program just exits from the waiting mode. If a legitimate key has been pressed, the program looks up the token for that key in a table, and then it prints the keyword that the token represents.

## Tokens

A token is a single byte used to represent a keyword. This way, a whole keyword such as RESTORE can be condensed into one character. Token values are always equal to or greater than 128 decimal or \$80 hexadecimal. This tokenization saves a lot of memory in BASIC storage of programs.

Upon LIST, BASIC automatically expands these tokens into the keywords that we are all familiar with.

Table of Tokens and the keywords that they represent:

128 - end	129 - for	130 - next
131 - data	132 - input#	133 - input
134 - dim	135 - read	136 - let
137 - goto	138 - run	139 - if
140 - restore	141 - gosub	142 - return
143 - rem	144 - stop	145 - on
146 - wait	147 - load	148 - save
149 - verify	150 - def	151 - poke
152 - print#	153 - print	154 - cont
155 - list	156 - clr	157 - cmd
158 - sys	159 - open	160 - close
161 - get	162 - new	163 - tab(
164 - to	165 - fn	166 - spc(
167 - then	168 - not	169 - step
170 - +	171 - -	172 - *
173 - /	174 - ±	175 - and
176 - or	177 - >	178 - =
179 - <	180 - sgn	181 - int
182 - abs	183 - usr	184 - fre
185 - pos	186 - sqr	187 - rnd
188 - log	189 - exp	190 - cos
191 - sin	192 - tan	193 - atn
194 - peek	195 - len	196 - str\$
197 - val	198 - asc	199 - chr\$
200 - left\$	201 - right\$	202 - mid\$
203 - go		



Notice that some tokens represent single characters such as +, >, and ±. When these characters are used outside quotes, BASIC assumes they will be part of some arithmetic operation. Within quotes, the same characters have a different value which is a PET ASCII code. By assigning two different values to the same character – depending on where it is used – BASIC can more quickly and easily determine the difference between a “+” meant for display and a “+” meant for execution.

### Example of Tokenization

Type the following as it appears

```
new
10 rem
poke 2053, 128
list
Now the line that should appear is
10 end
```

The value in location 2053 is the token that controlled the keyword that BASIC displayed just after it printed the line number. By changing the value in location 2053, according to our table above, we can control which keyword BASIC will display.

Now let's go on to application of the program. In the first paragraph, I mentioned that the program could take up to 52 keywords in its table and two specials. These specials are one-key entries of two commands, LIST and RUN. By pressing the F5 key, the BASIC program in memory is automatically LISTed from the beginning. No line range can be set such as LIST 100–200 with this function. The F7 key is an auto run key, just press it and the current BASIC program in memory is automatically run. As with the previous command, no line can be set for the run to begin at.

The other keywords are displayed using the above description of the waiting mode. When the F1 key is pressed, the computer is set up to wait for another key entry. After this, if any key is pressed, it decodes it and prints a keyword, if necessary, otherwise it just exits from waiting.

### An Example

Press the F1 key and then press the A key. The computer should now display the keyword POKE where the letter A used to be. Now for another. Press the F1 key and press the shift key and the A key together like you were going to get the graphic character off of the A key. The keyword PEEK should now appear where the graphic A character was.

The F3 key is also useful as a special key which has already been defined, this is to be used as a delete key. If, for instance, a wrong keyword has been displayed on the screen which is four characters in length, the delete key would have to be pressed four times. With this key, you just push it and the keyword just displayed, would be deleted. This key is just primarily useful to delete incorrectly entered keywords.

The keywords that are displayed are in accordance with the keyword table DATA statements that appear at the end of the program, namely lines 135–139. The table ascends for A to Z then from shifted A through shifted Z. If, for instance, the first data number in line 135 is changed from 151 to 176 and the program run again the following will happen. Upon pressing the F1 key and then the A key, the keyword OR will be placed on the screen rather than the keyword POKE.

Another method of changing the keyword that will be displayed, after the program has been lost from memory is to modify the table in memory. At \$c120 or 49440 in decimal is a table identical to that of the last data statements. By POKEing to this table, we can also change the keywords that are displayed. The table is also set up as in the data statements. Press the F1 key and then the A key; the keyword OR or POKE should be displayed. Now POKE 49440,128 and do the same procedure. The keyword END should now have been displayed.

Another item to remember is how to turn the program on and off. To enable, use the SYS that is given at the beginning of the program. To disable, press RUN–STOP/RESTORE.

By modifying the keywords that are displayed by using the table and/or the data statements, the keys and their matching keywords can be set up in a way that can be used easily and efficiently by the user.

### Editor's Note

Great program Darren! Hope to see more like it! One thing I noticed, that might be considered an added bonus, is the fact that your routine doesn't affect the value of the F1 key from a GET statement. Too often this is overlooked. Also, the utility is still in affect during an INPUT statement, but again with no nasty side effects.



As of running the program, the setup of the keys is as follows:

#### Un-Shifted

a = poke  
b = clr  
c = print#  
d = data  
e = end  
f = for  
g = goto  
h = get  
i = input  
j = mid\$  
k = right\$  
l = left\$  
m = tab(  
n = next  
o = log  
p = print  
q = rnd  
r = read  
s = step  
t = then  
u = save  
v = load  
w = verify  
x = len  
y = val  
z = sys

#### Shifted

A = peek  
B = chr\$  
C = cont  
D = dim  
E = def  
F = abs  
G = gosub  
H = return  
I = input#  
J = stop  
K = atn  
L = rem  
M = exp  
N = not  
O = open  
P = close  
Q = cmd  
R = restore  
S = str\$  
T = asc  
U = fre  
V = wait  
W = int  
X = spc(  
Y = sqr  
Z = rnd

```
10 print "Superkey 64"
20 print "by"
30 print "darren spruyt"
40 print "please wait"
50 for j=0 to 339 : read x : poke 49152+j, x
60 poke 1024, x : ch=ch+x : next
65 if ch <> 48346 then print "data error" : stop
70 print "Superkey to turn on: 'sys 49409'"
80 print "to turn off 'run stop/restore'"
90 print "table at 49440"
99 end
100 data 142, 18, 193, 140, 19, 193
110 data 141, 16, 193, 173, 17, 193
120 data 240, 77, 165, 215, 201, 133
130 data 208, 11, 169, 0, 141, 17
140 data 193, 234, 234, 234, 76, 244
150 data 192, 201, 134, 208, 29, 169
160 data 0, 133, 198, 174, 20, 193
```

```
170 data 240, 237, 169, 20, 230, 198
180 data 164, 198, 153, 119, 2, 200
190 data 202, 208, 245, 160, 0, 234
200 data 76, 212, 192, 234, 201, 135
210 data 208, 4, 169, 155, 208, 6
220 data 201, 136, 208, 205, 169, 138
230 data 160, 1, 140, 23, 193, 238
240 data 22, 193, 208, 44, 234, 234
250 data 234, 165, 215, 201, 133, 240
260 data 184, 201, 193, 144, 10, 201
270 data 219, 176, 6, 56, 233, 167
280 data 76, 122, 192, 201, 65, 144
290 data 163, 201, 91, 176, 159, 56
300 data 233, 65, 160, 0, 140, 23
310 data 193, 234, 170, 189, 32, 193
320 data 170, 160, 0, 132, 198, 160
330 data 158, 132, 34, 160, 160, 132
340 data 35, 160, 0, 10, 240, 17
350 data 202, 16, 16, 230, 34, 208
360 data 2, 230, 35, 177, 34, 16
370 data 246, 48, 241, 234, 234, 198
380 data 34, 200, 177, 34, 234, 48
390 data 10, 230, 198, 166, 198, 157
400 data 119, 2, 76, 169, 192, 230
410 data 198, 166, 198, 41, 127, 157
420 data 119, 2, 173, 23, 193, 240
430 data 12, 169, 138, 141, 119, 2
440 data 141, 23, 193, 208, 8, 234
450 data 234, 136, 169, 20, 141, 119
460 data 2, 230, 198, 141, 17, 193
470 data 140, 20, 193, 173, 22, 193
480 data 240, 14, 166, 198, 169, 13
490 data 157, 119, 2, 230, 198, 169
500 data 0, 141, 22, 193, 173, 16
510 data 193, 172, 19, 193, 174, 18
520 data 193, 76, 49, 234, 234, 120
530 data 169, 0, 141, 20, 3, 169
540 data 192, 141, 21, 3, 88, 96
550 data 96, 234, 0, 138, 236, 3
560 data 4, 234, 0, 138, 234, 234
570 data 234, 234, 234, 234, 234, 234
580 rem **** keyword token table ****
590 data 151, 156, 152, 131, 128, 129
600 data 137, 161, 133, 202, 201, 200
610 data 163, 130, 188, 153, 187, 135
620 data 169, 167, 148, 147, 149, 195
630 data 197, 158, 194, 199, 154, 134
640 data 150, 182, 141, 142, 132, 144
650 data 193, 143, 189, 168, 159, 160
660 data 157, 140, 196, 198, 184, 146
670 data 181, 166, 186, 186
```



# Commodore 64 Graphics Utility

BRAD TEMPLETON from Transactor July 83

Writing programs for the Commodore 64 can become rather cumbersome when you want to include high resolution graphics. The Basic has no commands that allow direct processing of the screen, and although there are cartridges and programs that offer special graphics commands, there are still two problems; one, you have to pay for them; and two, anyone else who wants to run your programs must also have the same extended commands installed. This graphics utility gives you 5 of the more common functions for manipulating the colour graphics screen. It's short enough (about 750 bytes) that it can be included as part of any Basic program. And best of all, it's free!

The routines work in multi-colour mode (sometimes called "medium-res") rather than actual high-res or "bit map" mode. Bit map mode offers better resolution, but Multi-colour mode allows for more colours - 4, as opposed to 2 in bit-map. Besides, the resolution is still pretty sharp - most games are programmed in multi-colour.

The plotting resolution is 160 horizontal (0-159) by 200 vertical (0-199). Combining these plotting commands with Basic programs to generate co-ordinates for, say, trigonometric functions makes the display task the easiest part. Adding POKes to alter other VIC II chip registers will give some spectacular results. With sprites, collision detect, and the other features, the combinations are limitless.

## About The Program

The first 15 bytes are jump vectors to the 5 commands. It's been assembled to reside in the 4K of RAM that sits between the Basic Interpreter ROM and the I/O chip. If you have other machine language that normally sits there, the source code (PAL format) is available from the Toronto PET Users Club so you can re-assemble it - it is not relocatable as is.

The vectors start at 49153. Setting a variable like BA (Base Address) to 49153 means you can easily access each command with a SYS BA plus some multiple of three between 0 and 12 (ie. SYS BA, SYS BA + 3, +6, etc.), or you could use other variable to store the addresses of each vector.

Parameters for each command can be explicit numbers, variables, or any expression that yields numeric results. RND, LEN, ASC, SIN, ATN are just a few. Use your imagination.

## The Commands

### Initialize - SYS 49153 or SYS BA

Format: sys ba, c0, c1, c2, c3

Sets up the colour graphics screen with 4 colours:

c0 : background	(53281)
c1 : alternate background #1	(53282)
c2 : alternate background #2	(53283)
c3 : goes into the colour nybbles	

When SYS BA is called, the screen is cleared to the background colour. In subsequent commands, the 4 colours chosen here can now be referenced using the numbers 0 to 3. Border colour must be set with POKE 53280, C.

### Read Location - SYS 49156 or SYS BA + 3

Format: sys ba + 3, row, column

Reads the given pixel. The colour, from 0 to 3, in that location will be stored in location 256 for you to PEEK at.



### Set Point – SYS 49159 or SYS BA + 6

Format: sys ba + 6, row, column, type

Turns the given pixel on or off. The type is a number from 0 to 3 and shows one of the four colours chosen in the initialize routine. Choose type 0 to turn point off (ie. background colour).

### Restore Text Mode – SYS 49162 or SYS BA + 9

Format: sys ba + 9 ( : print "S" )

Gives you back the normal text screen. The screen will be full of garbage from the colour graphics screen, so it's best to follow with a print clear screen.

### Draw Line – SYS 49165 or SYS BA + 12

Format: sys ba + 12, row1, column1, row2, column2, type

Draws a line from the point at row1/column1 to the point at row2/column2. The type, 0 to 3, sets the colour of the line. Again 0 = off. Example:

```
sys ba + 12, 0, 0, 199, 159, 3
```

...draws a diagonal line from the top left corner to the bottom right in colour 3. Use the same command replacing "3" with "0" to erase the line.

### Setting Up

The sample program draws a 3-D box. Line 90 calls the subroutine at line 1000 to POKE the program into memory. This is how you would include it in transportable programs, but for your own use you may wish to write a program file, if you have disk, and LOAD it from your program. To make a binary file of the utility, enter lines 1000 onward first. Then make these changes/additions.

```
Add: 900 open 8, 8, 8, "@0:g routines,p,w"
Chg: 1000 ... 49853 changes to 49855
Chg: 1010 ... poke j, x to print#8, chr$(x);
Add: 1025 close 8
Chg: 1030 ... ch<>84065 to ch<>84257
Add: 1045 data 0, 192
```

With the file in place, line 90 of the demo program would be replaced by:

```
90 if peek(49152)<>96 then load "g routines",8,1
```

The utility will only be loaded if the byte at 49152 is not 96. Subsequent RUNs will therefore not attempt to load it over again. Don't forget to include "1" at the end to specify a direct load file.

### Sample Program

```
90 gosub 1000
100 ba = 49153 : k = 48 : dr = ba + 12
110 sys ba, 9, 3, 0, 1
120 for x = 0 to 48 step 8 : p = 3 + (x = 48)
130 sys dr, x, x, x, 160 - x, p
140 sys dr, x, x, 192 - x, x, p
150 sys dr, x, 160 - x, 192 - x, 160 - x, p
160 sys dr, 192 - x, x, 192 - x, 160 - x, p
170 next x
180 sys dr, 0, 159, 192, 159, 3
190 sys dr, 193, 0, 200, 0, 0
200 for x = 0 to 8
210 sys dr, 0, 20 * x, k, k + 8 * x, 3
220 sys dr, 146, k + 8 * x, 192, 20 * x, 3
230 sys dr, k, k + 8 * x, 146, k + 8 * x, 2
240 next x
250 for x = 1 to 11
260 sys dr, x * 16, 0, 48 + x * 8, 48, 3
270 sys dr, k + 8 * x, k, k + 8 * x, 112, 2
280 sys dr, k + 8 * x, 112, x * 16, 160, 3
290 next x
300 get i$ : if i$ = "" then 300
310 sys ba + 9 : print "S"
320 end
1000 for j = 49152 to 49853
1010 read x : ch = ch + x : poke j, x
1020 next
1030 if ch<>84065 then print "data error" : stop
1040 return
1050 data 96, 76, 76, 193, 76, 169
1060 data 193, 76, 143, 193, 76, 192
1070 data 193, 76, 217, 193, 76, 90
1080 data 192, 76, 102, 192, 76, 24
1090 data 193, 169, 0, 133, 25, 169
1100 data 32, 133, 26, 169, 0, 168
1110 data 162, 32, 145, 25, 200, 208
1120 data 251, 230, 26, 202, 208, 246
1130 data 169, 0, 133, 25, 133, 27
1140 data 169, 7, 133, 26, 160, 231
1150 data 169, 219, 133, 28, 162, 4
1160 data 165, 251, 145, 27, 165, 252
1170 data 145, 25, 136, 192, 255, 208
1180 data 243, 198, 26, 198, 28, 202
1190 data 208, 236, 96, 169, 255, 96
1200 data 165, 251, 201, 200, 176, 247
```



1210 data 165, 252, 201, 160, 176, 241  
 1220 data 152, 72, 32, 136, 192, 160  
 1230 data 0, 165, 252, 74, 8, 74  
 1240 data 177, 25, 176, 4, 74, 74  
 1250 data 74, 74, 40, 176, 2, 74  
 1260 data 74, 41, 3, 133, 163, 104  
 1270 data 168, 165, 163, 96, 165, 251  
 1280 data 74, 74, 41, 254, 168, 185  
 1290 data 180, 192, 133, 25, 185, 181  
 1300 data 192, 133, 26, 165, 251, 41  
 1310 data 7, 133, 163, 165, 252, 41  
 1320 data 252, 10, 144, 2, 230, 26  
 1330 data 24, 5, 163, 101, 25, 133  
 1340 data 25, 144, 2, 230, 26, 96  
 1350 data 0, 32, 64, 33, 128, 34  
 1360 data 192, 35, 0, 37, 64, 38  
 1370 data 128, 39, 192, 40, 0, 42  
 1380 data 64, 43, 128, 44, 192, 45  
 1390 data 0, 47, 64, 48, 128, 49  
 1400 data 192, 50, 0, 52, 64, 53  
 1410 data 128, 54, 192, 55, 0, 57  
 1420 data 64, 58, 128, 59, 192, 60  
 1430 data 0, 62, 0, 4, 40, 4  
 1440 data 80, 4, 120, 4, 160, 4  
 1450 data 200, 4, 240, 4, 24, 5  
 1460 data 64, 5, 104, 5, 144, 5  
 1470 data 184, 5, 224, 5, 8, 6  
 1480 data 48, 6, 88, 6, 128, 6  
 1490 data 168, 6, 208, 6, 248, 6  
 1500 data 32, 7, 72, 7, 112, 7  
 1510 data 152, 7, 192, 7, 133, 164  
 1520 data 152, 72, 32, 136, 192, 165  
 1530 data 252, 41, 3, 168, 185, 72  
 1540 data 193, 72, 165, 252, 74, 8  
 1550 data 74, 165, 164, 176, 4, 10  
 1560 data 10, 10, 10, 40, 176, 2  
 1570 data 10, 10, 133, 164, 104, 160  
 1580 data 0, 49, 25, 5, 164, 145  
 1590 data 25, 76, 129, 192, 63, 207  
 1600 data 243, 252, 32, 253, 174, 32  
 1610 data 158, 183, 142, 33, 208, 32  
 1620 data 253, 174, 32, 158, 183, 138  
 1630 data 10, 10, 10, 10, 133, 164  
 1640 data 32, 253, 174, 32, 158, 183  
 1650 data 138, 41, 15, 5, 164, 133  
 1660 data 252, 32, 253, 174, 32, 158  
 1670 data 183, 134, 251, 173, 17, 208  
 1680 data 9, 32, 141, 17, 208, 173  
 1690 data 22, 208, 9, 16, 141, 22  
 1700 data 208, 169, 28, 141, 24, 208  
 1710 data 76, 25, 192, 32, 253, 174

1720 data 32, 158, 183, 134, 251, 32  
 1730 data 253, 174, 32, 158, 183, 134  
 1740 data 252, 32, 253, 174, 32, 158  
 1750 data 183, 138, 76, 24, 193, 32  
 1760 data 253, 174, 32, 158, 183, 134  
 1770 data 251, 32, 253, 174, 32, 158  
 1780 data 183, 134, 252, 32, 90, 192  
 1790 data 141, 0, 1, 96, 173, 17  
 1800 data 208, 41, 223, 141, 17, 208  
 1810 data 173, 22, 208, 41, 239, 141  
 1820 data 22, 208, 169, 20, 141, 24  
 1830 data 208, 169, 0, 24, 96, 169  
 1840 data 0, 133, 171, 133, 174, 32  
 1850 data 253, 174, 32, 158, 183, 134  
 1860 data 166, 32, 253, 174, 32, 158  
 1870 data 183, 134, 168, 32, 253, 174  
 1880 data 32, 158, 183, 138, 56, 229  
 1890 data 166, 176, 6, 73, 255, 105  
 1900 data 1, 198, 174, 133, 173, 32  
 1910 data 253, 174, 32, 158, 183, 138  
 1920 data 56, 229, 168, 176, 6, 73  
 1930 data 255, 105, 1, 198, 171, 133  
 1940 data 170, 32, 253, 174, 32, 158  
 1950 data 183, 134, 176, 165, 173, 197  
 1960 data 170, 176, 2, 165, 170, 133  
 1970 data 175, 169, 0, 133, 163, 165  
 1980 data 170, 133, 164, 32, 162, 194  
 1990 data 165, 163, 133, 169, 165, 164  
 2000 data 133, 170, 169, 0, 133, 163  
 2010 data 165, 173, 133, 164, 32, 162  
 2020 data 194, 165, 163, 133, 172, 165  
 2030 data 164, 133, 173, 169, 128, 133  
 2040 data 167, 133, 165, 162, 169, 32  
 2050 data 140, 194, 162, 172, 32, 140  
 2060 data 194, 166, 175, 165, 168, 133  
 2070 data 252, 165, 166, 133, 251, 165  
 2080 data 176, 32, 24, 193, 165, 167  
 2090 data 24, 101, 169, 133, 167, 165  
 2100 data 168, 101, 170, 133, 168, 165  
 2110 data 165, 24, 101, 172, 133, 165  
 2120 data 165, 166, 101, 173, 133, 166  
 2130 data 202, 208, 214, 96, 181, 2  
 2140 data 16, 17, 56, 181, 0, 73  
 2150 data 255, 105, 0, 149, 0, 181  
 2160 data 1, 73, 255, 105, 0, 149  
 2170 data 1, 96, 162, 16, 169, 0  
 2180 data 6, 164, 42, 176, 14, 197  
 2190 data 175, 144, 2, 229, 175, 38  
 2200 data 163, 38, 164, 202, 208, 240  
 2210 data 96, 229, 175, 56, 176, 243



---

Continued from page 25 - Hi-Resolution Graphics Program

```
220 POKEBY,PEEK(BY)OR(2+BI)
230 RETURN
240 POKE1024,16
250 GETA$:IFA$<>" "THEN250
260 POKE53265,PEEK(53265)AND223
270 POKE 53272,PEEK(53272)AND247
271 POKE 53270,PEEK(53270)OR8
275 CLR:PRINTCHR$(19):PRINT" ":END
300 GETA$:IFA$=""THEN300
302 IF A$=CHR$(135)THEN20
304 IF A$="A"THENX=X-1:Y=Y
305 IF A$="D"THENX=X+1:Y=Y
306 IF A$="X"THENX=X:Y=Y+1
307 IF A$="W"THENX=X:Y=Y-1
309 IF A$="Q"THENX=X-1:Y=Y-1
310 IF A$="C"THENX=X+1:Y=Y+1
311 IF A$="E"THENX=X+1:Y=Y-1
312 IF A$="Z"THENX=X-1:Y=Y+1
313 GOTO300
```

---

LETTERS TO THE EDITOR - Continued from page 7

Dear Sir,

Unfortunately we are finding that a lot of the programs you print in your magazine for the VIC-20, we are unable to complete due to the poor quality of the print. The program we are presently having a problem with is the one printed in your November issue on page 13, named "BRON'S TUTORIAL". The line which is causing the program to fail is line 270. If you can help us with our problem, it would be appreciated. We spent several hours trying to decipher this line, as it is not very clear and have tried alternatives.

Thanking you,

Tune Family S. Tune.

ED:- The line is:

```
270 PRINT"0000";R;"*";Q;:INPUT"=";J$
```

This letter does highlight a problem that we have. If you send a listing to us please send it on disk or tape so that we can set it with a decent printout.

Dear Sir,

I am 11 years old and am interested in Computers. I own a Commodore 64 and was wondering if you could inform me as to whether there are any Commodore 64 Users Clubs around. Please print your reply in the Commodore magazine.

Yours faithfully,

(Master) David Perrott

ED:- David, I don't know of any user groups in your area. I do come to Hyams a lot myself and shall try and call in to see you. I have sent you a copy of the VIC MENU that lists all known user groups. P.S. why not start one yourself, I'm sure there are a lot of users in Nowra and surrounding area.



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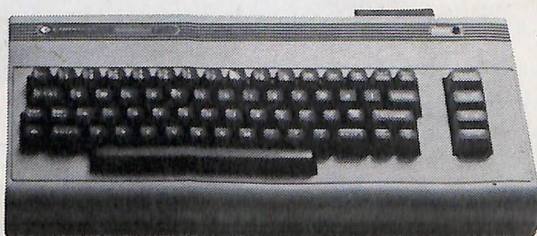




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